European Commission

Public Procurement of Nature-Based Solutions

Addressing barriers to the procurement of urban NBS: case studies and recommendations

Independent Expert Report

Public Procurement of Nature-based Solutions

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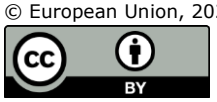

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EUROPEAN COMMISSION

Public Procurement of Nature-Based Solutions

Addressing barriers to the procurement of urban NBS: case studies and recommendations

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This research has been done as part of the **European Commission *Task Force 3 Governance, Business Models, and Financial Mechanisms* activities**. This Task Force collaborates in the areas of business, finance and governance models, within the overriding objective of advancing the development, uptake and upscale of NBS. The Task Force was created as a collaborative space and clustering channel for all relevant Horizon 2020 funded NBS projects to ensure coherence, synergies, maximum visibility and EU added value, whilst simultaneously upholding project specific developments and implementation.

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INTRODUCTION

1 Why do we need Nature-Based Solutions?

With the percentage of the global population living in urban areas set to reach 68% by 2050[1], cities across the world are growing at an unprecedented pace.

Whilst city life offers evident benefits that continue to attract people, rapid urbanisation can drive significant conflicts between natural and urban environments. Challenges associated with those conflicts, such as human health issues, degradation of natural capital and ecosystem services, and vulnerability to climate change and natural disasters, all threaten the sustainability of our urban lifestyles.

Nature-Based Solutions (NBS) can be a powerful tool for cities dealing with those challenges. The European Commission defines NBS as "solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience." The goal of such solutions is to "bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions. Nature-based solutions must benefit biodiversity and support the delivery of a range of ecosystem services"[2]. In practice, NBS are pieces of infrastructure introduced within cities to replicate natural ecosystems and deliver some of the ecosystem services they provide - whether it be leisure, climate change adaptation and mitigation, or enhancing biodiversity.

2 Public procurement to deliver NBS?

Despite the evident social and environmental value of NBS, some cities are facing challenges in delivering these solutions. In particular, many public authorities report difficulties in using public procurement to implement NBS projects. This introductory guide to the public procurement of NBS aims to address this issue by providing cities with a better understanding of the topic and inspiring public procurers to take the first step on this journey. It complements several other reports developed as part of Horizon2020 projects, such as Municipal Governance Recommendations by UNaLab and Clever Cities[3] that explored other delivery mechanisms that cities can use to implement NBS.

The below sections provide a snapshot of the current state-of-play of the public procurement practices, challenges, and opportunities across European cities. This research has been done as part of the European Commission *Task Force 3 Governance, Business Models, and Financial Mechanisms* activities, and the information presented here draws together insights from two main sources:

- A workshop on NBS procurement held in Paris as part of the ThinkNature Paris Forum on NBS in April 2019. During this event, 25 Horizon 2020 project representatives working on the research and application of NBS across various European cities and regions came together to discuss challenges and opportunities for the procurement of NBS. Attendees included both researchers, and private sector representatives.

- Case studies collected during April 2019 – September 2020 from across the UNaLab, Clever Cities, ProGiReg, GrowGreen, and Connecting Nature projects

The report is structured as follows:

[1] https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html
[2] https://ec.europa.eu/research/environment/index.cfm?pg=nbs
[3] Clever Cities D5.3 Governance, business, and finance models report

- Section 1: **Challenges for the procurement of NBS** provides an overview of the challenges to the procurement of NBS, as identified through the workshop and case studies. The challenges identified relate to the perspective of both public procurers and local policymakers.

- Section 2: **Case studies** provides 12 case studies that i) illustrate how those challenges impact the delivery of NBS procurement projects in practice; ii) provide examples of good practice to overcome them successfully.

- Section 3: **Suggested actions to facilitate NBS procurement** extracts insights and lessons learnt from the workshop and case studies, suggesting practical solutions to support local policymakers and public procurers in driving NBS procurement projects.

CHALLENGES FOR THE PROCUREMENT OF NBS

3 General challenges

3.1 Distinguishing NBS procurement from green public procurement

The workshop discussion on the procurement of NBS have highlighted that public procurers might not be aware of the distinction between public procurement of NBS, green public procurement (GPP) and Sustainable Public Procurement (SPP).

Where public procurement of NBS refers to the procurement of solutions falling within the definition set out in the introduction, green public procurement (GPP) relates more generally to a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle[4]. Sustainable Public Procurement (SPP) refers to a similar process, but also takes into account the social impacts of the public purchases in addition to environmental considerations.

In short, NBS are products or services that can be procured, whilst GPP and SPP denote set of practices that aim to introduce environmental and/or social considerations into specific public purchases (please see Figure 1).

Whilst principles of GPP and SPP can support the successful procurement of NBS, the widespread confusion between these three terms is detrimental to the discussion of NBS procurement. The uncertainty between the three terms might also be due to the relative novelty of the NBS concept in the mainstream urban planning practices, which implies that the public procurers might lack the general knowledge of what NBS entails. Hence, developing a clearer understanding of NBS among public procurers will be key to support action on this topic.

[4] https://ec.europa.eu/environment/gpp/what_en.htm

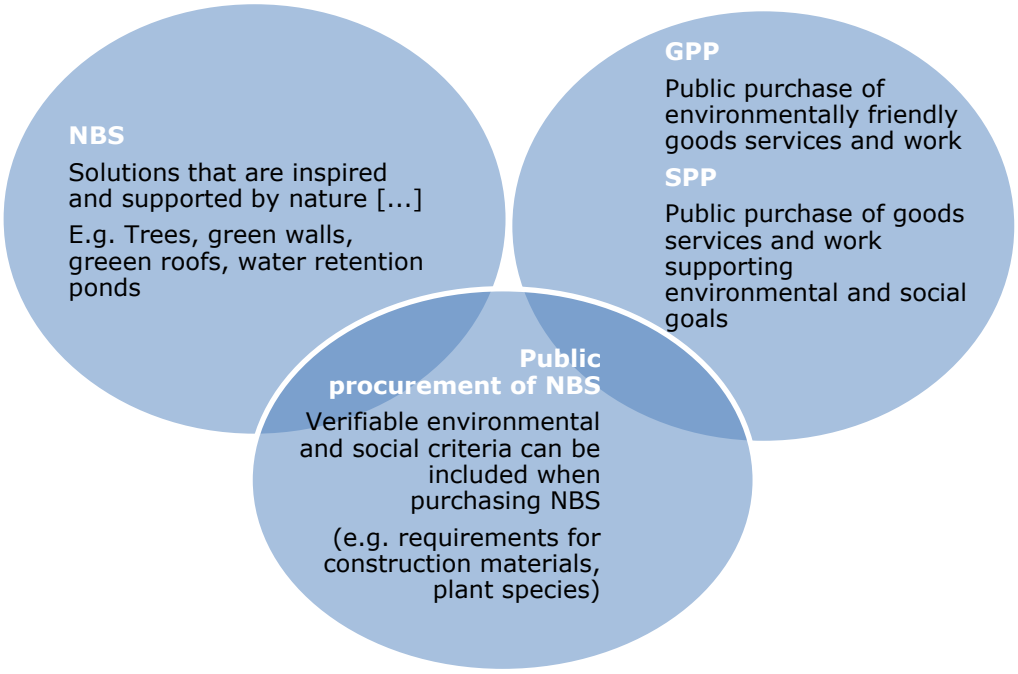

Figure 1. NBS, GPP and SPP

4 Challenges for public procurers

4.1 Lack of knowledge and experience with NBS

The lack of knowledge and experience with NBS among procurement practitioners has been identified as a key barrier for successful NBS uptake. In particular, there seems to be a lack of a widespread consensus on the reliable measurement and quantification of NBS performance that could provide robust information on the associated costs and benefits.

It is rather challenging to compile universal NBS cost guidelines, as NBS projects can be extremely dependent on the local context implying that the specific needs of the city, climatic conditions, landscape, project site, access to suppliers and other parameters influence NBS project features and the subsequent implementation and maintenance cost structure.

Additionally, NBS often provide benefits to a much larger area than conventional engineering solutions. Since NBS are living solutions, these benefits are expected to last for much longer. These factors add to the complexity of accounting for the full range of costs and benefits of NBS. While some of the benefits can be quantified (e.g. through an increase in local rental values), procurement officers often lack the information and/or skills and capacity to apply effective tools and methods to assess the diverse benefits (environmental, social, and economic) obtained at different stages of the development of NBS.

Public procurers with limited experience of NBS might, therefore, find it difficult to put together a convincing business case for projects. Support and training may be required to help public procurers address this challenge and instil confidence in NBS in municipalities.

4.2 Lack of NBS typology

The absence of a simple NBS typology has been identified as another challenge facing NBS procurement. Despite continuous research efforts under Horizon 2020 projects[5], and the EC Task Force 2 work on the NBS Impact Evaluation Framework, the strong diversity of needs and technologies related to NBS mean that developing a systemic classification remains rather challenging.

The resulting uncertainty on the type of service or works to be procured and their corresponding performance can prove challenging for public procurers, notably where a degree of innovation is required to develop technologies that are adapted to specific local circumstances.

Procurement officers often lack the "common language" and technical expertise that would facilitate communication with the suppliers and valuation of the relevant ecosystem services.

4.3 Difficulty finding skilled suppliers

Where contract values are low and technical requirements are high, public authorities report difficulties in finding suppliers willing to bid for NBS projects. This results in procurement exercises attracting low numbers of bids, hampering competition, and the quality of the offer.

4.4 Challenges in community engagement

Many communities have had negative experiences of engaging with public authorities, notably where there is an impression that the local community's problems and views have not been acted upon in the past. This can lead to a lack of trust in city's commitment to deliver NBS projects that truly reflect the community's values, resulting in consultation fatigue and a lack of engagement.

Such a lack of trust and interest can constitute a significant barrier to the development of co-designed NBS projects.

4.5 Institutional and legal barriers

Procurement officers might lack the political and institutional support to drive forward NBS projects. This is especially true in cities facing strict budget constraints, where NBS projects might not be prioritised and where they have to compete against other infrastructure projects for funding. Often, traditional paradigms of spatial planners persist (i.e. related to path dependency and long-term predictability) that tend to favour conventional engineering solutions.

The question of maintenance can also be a ground for conflict when responsibilities and budgets are not clearly defined in advance. There are existing cases of NBS where insufficient funds have been allocated for maintenance and/ or the responsibility of maintaining the infrastructure was not clearly assigned between the various city departments. The resulting lack of maintenance hinders the functionality and performance of NBS, creating an even more challenging climate for NBS acceptance.

4.6 Perceived reputational risk

Since public procurement officers are dealing with the taxpayers' money, they might lean toward risk-averse, as well as thorough and predictable processes, thus favouring conventional solutions. Because of the rather limited track record of NBS projects so far, public procurement officers might struggle with incorporating sustainability and innovation-

[5] For example, https://oppla.eu/nature-based-solutions-terminology-survey?pk_campaign=Outline

driven criteria into the tendering process. NBS project proposals carry a risk of being perceived as high-cost and high-risk (e.g. if the maintenance is not carried out properly). This could lead to reputational concerns for public procurement officers, hindering their willingness to drive projects forward.

4.7 Limited access to funding

As public budgets have shrunk over the past decade, accessing funding for NBS is a clear issue for public procurers wanting to drive projects forwards. NBS projects are unlikely to be prioritised in a city's budgets, and the integration of NBS requirements in the procurement of wider infrastructure projects is likely to be challenged if it drives costs up.

5 Addressing barriers to the public procurement of NBS

While the listed barriers might leave an impression that procuring NBS is challenging, there are numerous examples of cities successfully procuring NBS. The below case studies and recommendations section put forward concrete ways in which challenges to NBS procurement can be tackled.

CASE STUDIES

Despite the barriers set out in the above section, cities around Europe are increasingly embarking on initiatives to procure NBS.

The below case studies illustrate 9 cities' views on the challenges at hand and highlight the solutions they are developing to address them and deliver projects. The objective of the case studies is to demonstrate that delivering NBS projects through procurement is feasible, and to inspire public procurers to address barriers they may encounter.

The case studies were collected from European cities, who have procured or are planning to procure NBS (or in some cases NBS planning services). With the exception of one city (Frederiksberg), those NBS projects were supported by the Horizon 2020 funding programme. Information was kindly provided by the municipal representatives of the cities of Manchester, Wroclaw, Glasgow, Turin, Eindhoven, Genoa, Tampere, London, and Frederiksberg, as well as project officers of UNaLab, Clever Cities, ProGiReg, GrowGreen, and Connecting Nature. This information-gathering exercise took place between April 2019 and September 2020.

The Case Studies section contains two subsections:

1) **Exploring NBS procurement opportunities - snapshot case studies**

For some cities, information was compiled through an online survey. The resulting "Exploring NBS procurement opportunities - snapshot case studies" subsection provides information on the steps taken by those cities to procure NBS solutions. These case studies focus on challenges that the cities generally face with NBS procurement, highlighting the steps they have taken to address the challenges in specific projects.

2) **NBS procurement practice - deep dive**

In other cases, detailed information was gathered on successful NBS procurement projects implemented by the participating cities. For those case studies, projects tender documents were analysed and interviews were held with city representatives to provide detailed insights into successful examples of NBS procurement. The only exception is the case study from Frederiksberg, which was originally published on the European GPP Good Practice webpage, and which the city kindly allowed us to reproduce and integrate in this report. These case studies are provided in the "NBS procurement practice deep dive" subsection.

6 Exploring NBS procurement opportunities - snapshot case studies

6.1 Manchester, England: inter-city cooperation as a solution to access skilled suppliers

Snapshot Case Study Introduction: Manchester	
No. of inhabitants in the city	547,000
Procuring authority	Manchester City Council
Types of NBS procured	New climate-resilient park in East Manchester, including sustainable urban drainage features
Project value	£1.3m / €1.46m
Challenges faced	Difficulty in finding contractors with experience of delivering NBS project
H2020 Project	GrowGreen

Context

The City of Manchester, in the North of England, is regularly affected by heavy rainfall and severe flooding.

The need to find long-lasting solutions to this problem in the context of climate change led it to join the GrowGreen H2020 project. Under GrowGreen, it developed a large scale NBS project aiming to address flooding issues in the part of city area named Gorton. The resulting scheme, which the city went out to procure, was a new community park including extensive Sustainable Urban Drainage Systems (SuDS) features. Focus was also given to biodiversity-friendly planting and the community was widely involved in the design process.

Challenges

Procurement was undertaken separately for design and construction activities. The city was able to use an existing framework agreement to procure the design works, allowing the city to save time and resources and to leverage existing relationships with suppliers.

Procuring a building contractor, however, proved to be more challenging. A call for tenders was launched through the North West Construction Hub which is the preferred framework for construction works in the Manchester City Region. However, no proposals were received from companies in this framework. Reasons provided included a lack of expertise in the storm-water management aspects of the project, lack of availability of staff, security concerns on the site. Finding suitable and skilled suppliers able to deliver the project was therefore a key challenge for the City.

Solution

This issue was eventually overcome through local inter-city cooperation.

Manchester engaged with its neighbouring municipality - Salford City Council - to discuss their difficulty in identifying suitable suppliers. Through those discussions, it appeared that Salford City Council had access to a good pool of landscaping contractors through one of its existing procurement frameworks. Salford allowed Manchester to post it call for tender

using their framework agreement, which proved successful as Manchester was able to secure a suitable contractor. The works were completed in June 2020.

More information on the project is available on the GrowGreen website.

Figure 2 New community park including SUDS in West Gorton, Manchester. © Manchester City Council

6.2 Wroclaw, Poland: adjusting tender requirements to match suppliers' capabilities

Snapshot Case Study Introduction: Wroclaw	
No. of inhabitants in the city	630,000
Procuring authority	The City of Wroclaw
Types of NBS procured	Various NBS including swales, raingardens, community gardens, trees, climbing plants etc.
Project value	Not publicly available
Challenges faced	Difficulty in finding contractors with experience of delivering NBS project
H2020 Project	GrowGreen

Context:

The City of Wrocław procured the design of NBS solutions for the GrowGreen demonstration sites through a standard procurement procedure for contracts below the European threshold of €30,000.

A restricted procurement exercise was undertaken to secure a design team for all the demonstration sites. No specific challenges for this procurement were anticipated, as the procedure required directly addressing potential consultants with strong track records of delivering similar projects.

Challenges

Some issues occurred concerning the demonstration tender, mostly related to:

- Balancing the conditions for participating in the procedure and the experience of potential bidders (on one hand, not so many projects have been realised in the field of NBS and sustainable rainwater management, meaning few companies have relevant experience. On the other hand, having experience is important given the potential risks related to the work being completed by an inexperienced contractor);
- The assessment criteria (it was difficult to set clear, quantifiable and indisputable criteria); and,
- The formal/financial requirements (security deposit, bank guarantee, etc.) were difficult to handle and disproportionate in terms of the procedure for potential small contractors that the tender was addressing.

Despite the procurement office's awareness and mitigation attempts, no proposals were received from companies during the first call for the reasons above.

Solution:

The condition related to expertise in sustainable rainwater management and design had to be lifted, as it turned out to be impossible to achieve. The formal/financial requirements were lowered to raise the interest of landscaping SMEs. The second call for tender has been successful, however, only one proposal was submitted per demonstrator site.

More information on the project is available on the GrowGreen website.

Figure 3: Urban Park in Wroclaw. © Janusz Krzeszowski www.wroclaw.pl

6.3 Glasgow, Scotland: procedural barriers to NBS procurement

Snapshot Case Study Introduction: Glasgow	
No. of inhabitants in the city	626,000
Procuring authority	Glasgow City Council • Parks Development Team • Flooding Team

Types of NBS procured	Various, including rainwater management solutions
Project value	Not publicly available
Challenges faced	1. Difficulty in demonstrating value of NBS to meet city's investment criteria 2. Lack of procurement expertise in the teams responsible for NBS 3. Difficulty in finding NBS suppliers through standard procurement channels
H2020 Project	Connecting Nature

Challenges

The representatives of the City of Glasgow identify the following challenges to NBS procurement in the city:

- Difficulties in demonstrating the business case for NBS

Glasgow City Council has a procurement system that requires an initial procurement assessment form to be filled and assessed before being sent to the corporate procurement team. The city has to go through a test of the best value for using external resources in case internal resources are not sufficient, and the decision to use external resources has to be thoroughly justified through strict criteria.

In particular, the awarding organisation is required to evidence best value decisions through a due diligence process and related documentation must be retained and filed for audit purposes (e.g. market analysis, cost analysis, benchmarking process, evaluation criteria & selection process, supply chain analysis, procurement strategy, service level agreement, etc.). Those requirements can be difficult to meet when the precise costs and benefits of NBS are difficult to quantify, as the city lacks internal expertise in the preparation of robust business cases for NBS.

- Lack of staff expertise and budget cuts

The city's park development and flooding teams, which oversee NBS projects for the city, also lacks dedicated resources and skilled staff to embark on innovative procurement processes that could support NBS delivery. Whilst Glasgow has a specialised procurement unit, it operates like a private consultancy and charges other departments for any advice that they provide. Budget cuts have also meant that skilled staff taking early retirement have not been replaced, leading to a loss of procurement knowledge within teams that could otherwise have embarked onto NBS procurement projects.

- Difficulties in accessing suitable NBS suppliers

The city generally finds contractors by issuing calls for tender on the standardised contract pools of the Scottish Government, which are a good channel to reach out to a wide range of suppliers. However, this solution is suboptimal for NBS as, if a tender does not fit well within a pool, it can be difficult to access suppliers with relevant skills. The city reports having ended up with the wrong contractors who are not the right fit for NBS projects numerous times, either through a lack of understanding of a project or insufficient expertise.

Solutions

The city is trying to address these issues in the following ways:

- The city has developed alternative delivery routes to avoid the need to go through their own procurement procedures NBS projects. The parks development and flooding teams regularly collaborate with charities and other public bodies whose procurement powers are less restricted in order to bypass the issues that it faces when procuring NBS projects. The organisations with which they regularly collaborate include Scottish Natural Heritage, Central Scotland Green Network and Greenspace Scotland.

- A temporary business manager was appointed for the planning service, to promote more efficient and effective cooperation between the planning department and the parks development and flooding teams including on procurement matters.

- The city is trying to improve the quality of the offers it receives through framework agreements by placing as much value as possible on the quality of the submission versus the cost in the tender specifications that it issues there.

Figure 4: Green space near Glasgow © Daniel Manastireanu from Pixabay

7 NBS procurement in practice- deep dive case studies

7.1 Turin, Italy: procuring green walls through a competitive procedure with negotiation

Deep Dive Case Study Introduction: Turin	
No. of inhabitants in the city	885,000
Procuring Authority	City of Turin
Project site	Mirafiori Sud: a former industrial neighbourhood targeted for community-led regeneration

Types of NBS procured	Green walls for two public buildings: • A school building (indoor green wall solution)- LOT 1 • A homeless shelter (outside walls)- LOT 2
Size of NBS procured	100m^2
Length of the contract	3 years
Project value	€40,000
H2020 project	ProGiReg (Productive Green Infrastructure for post-industrial urban regeneration)

Figure 5: Lot 1- internal green wall in Turin school building (computer visualisation) © Turin City Council

Figure 6 Lot 2 external green wall in Turin homeless shelter (computer visualisation) © Turin City Council

This procurement exercise was run by the City of Turin, the Capital city of the Piedmont region in Italy.

The procurement exercise formally started in June 2019 with the publication of a Preliminary Information Notice (PIN) and was completed in November 2019 with the award of a 3-year contract for both lots to a single supplier. The project is under construction as of May 2020, although the works have been delayed by Covid 19 restrictions.

Procurement objectives

The goal of the procurement exercise was to secure a supplier who would install 100m2 of green walls at specified locations for two buildings, and provide complete maintenance services for 3 years.

After those first 3 years, the green walls should be easy and cheap to maintain by the municipality, as required by the technical specifications.

The City chose a competitive procedure with negotiation, which was necessary to explore and assess the different technologies that the market could offer to meet their goals. A PIN was issued before the call for tenders to enable suppliers to prepare for the exercise.

Market engagement

The PIN was issued in June 2019, with the market given 6 weeks to reply. The two primary goals of this consultation were to make suppliers aware of the upcoming call for tenders and to provide the City with an overview of the green wall technologies that the market could offer. Four suppliers replied to the PIN to express interest in the upcoming tender.

Community engagement

Community engagement was key in determining the buildings selected for the project. The City considered several schools and public buildings and engaged with their occupants. The purpose was to find occupants who were truly interested in the project, would benefit from it, and were motivated to take part in maintenance duties in the long-run.

This engagement process helped to select two buildings where the installation of the green walls could have important community benefits:

- A school where teachers are keen on using the infrastructure as an educational tool for the students.

- A run down and overlooked homeless shelter, where green walls will provide residents with contact to nature and provide opportunities to learn new skills through maintenance activities.

Procurement criteria

Criteria type	Description
Subject matter	Progireg experimental green walls including maintenance
Selection criteria	• Minimum turnover: 3 year turnover of minimum €20,000 • Registration in the Chamber of Commerce, Industry, Crafts, Agriculture • Compliance of the supplier with the payment of social security and welfare contributions • Compliance of the supplier with the law
Technical specifications	Suppliers were provided with specific measurements and suggestions about materials and plants that could be used to meet specific goals, which the Polytechnical University of Turn helped define. Among the required outcomes was the use of plant species that would be cheap and easy to maintain and a structure that could be easily dismantled and reassembled by schoolchildren. Suppliers were then left free to offer a technical solution that would match this set of requirements.
Award criteria	Given the price of the contract was fixed from the beginning, the contract was awarded based purely on the quality of the technical offer.
Contract performance clauses	The city required the contractor to take out insurance for the value of the installation and maintenance works to be performed over the life of the contract.

Results

- Three suppliers bid for the two lots, but only two were able to offer a suitable solution for the set value of the contract. Of the two remaining bidders, the city chose the supplier which provided the easiest to maintain technology, in line with the award criteria.

- The low number of bids received seemed to be largely driven by the value of the contract (€40,000), which several suppliers stated was insufficient to deliver the city's expectations over 3 years. The result was however positive as the city was able to secure a suitable supplier within the set budget

Environmental impact

Whilst the contract does not involve a requirement to monitor the environmental impacts of the project, the following environmental benefits are anticipated to derive from it:

- Increase in the presence of insect pollinators in an area of the city which critically lacks green spaces and biodiversity (Lot 2)

- Reduction of indoor contaminants thanks to the presence of vegetation (Lot 1)

- Better drainage and improved thermal insulation of the building (Lot 2)
- Environmental education: the project will help school children learn how to look after nature, which will contribute to creating a more environmentally-aware society (Lot 2)
- Change in mentalities: it is hoped that the anticipated positive aesthetic impact of the external green wall on the public perception of the area will help more people within the City Council understand the value of NBS, supporting further greening of the city (Lot 2).

Social impact

- For Lot 1, the green wall has been designed so that children can be involved in its maintenance. This will help them gain contact with plants and nature in an otherwise industrial part of the city, creating opportunities for hands-on environmental education. This maintenance arrangement also helps reduce the long-term economic costs of the project.
- For Lot 2, it is expected that the improved outlook of the homeless shelter building will contribute to better integration of its residents within the local community. By transforming its run-down facade into a local landmark, the installation may increase the attention given by passers-by to the building and instigate a sense of visibility and pride in its residents.

LESSONS LEARNT- TURIN

- The use of **externally funded pilot projects** can be a good approach to **overcome administrative barriers to NBS** projects and kick-start organisational change. In Turin, the bureaucratic system is not well equipped to support the procurement of sustainable, innovative, or unconventional products. Therefore, NBS procurement initiatives are usually faced with long timescales and administrative barriers. Going through the ProGiReg programme however, provided a strong help in bypassing those barriers. It also provided an opportunity for people sharing an interest in NBS within the Council to get to know each other, paving the way for potential further collaboration.
- Public procurement of NBS is still a new topic, and **learning from other cities' experience** on the topic is valuable. Being able to discuss the experiences of other members of the ProGiReg network was instrumental in shaping the success of Turin's procurement exercise. Engaging with established NBS interest groups can be a useful way of getting inspiration and shaping successful projects.

- Rigid **health and safety regulations can be a barrier to community participation** in the implementation of NBS projects. In Turin, the design of the indoors green wall had to be carefully crafted to meet legal requirements, and additional regulations will set limits on the extent to which children can be involved in maintenance activities. In times of Covid 19, regulations might need to be re-invented to support the involvement of the community in physically-distanced maintenance activities.

- **Limited resources** are a key issue for the successful public procurement of NBS. As the tender value was relatively low, it struggled to attract significant interest from the market. Offering a long term pipeline of projects (e.g. through a framework agreement) may help attract suppliers, however, funding is a key constraint. The city is, however, hoping that:

    - as NBS solutions become more mainstream and technologies are better established, prices will go down;
    - the success of such pilot projects could positively change the perception of NBS projects within the council and encourage more staff members to allocate resources to it.

- Direct public procurement is only part of the solution to support the large-scale delivery of NBS in cities. Publicly-led projects can be used to create visibility and interest in the topic locally, however **alternative delivery mechanisms** can be explored to complement public-led activities. For example, Turin is considering using the interest in NBS sparked by the project to introduce a system of tax incentives for private developers who introduce green walls in their projects.

7.2 Genoa, Italy: procuring a new urban park through an open tendering procedure

Deep Dive Case Study introduction: Genoa	
No. of inhabitants in the city	574,090
Procuring authority	Municipality of Genoa
Project site	Gavoglio area (Lagaccio district): a former military barracks
Types of NBS procured	Urban park and its components including green spaces, rain water management and collection, depuration and reuse elements, reduction of heat stress
Size of NBS procured	10 000 m^2
Length of the contract	3 years

Project Value	€3,859,680
H2020 project	UNaLab (Urban Nature Labs)

Genoa suffers from repeated exposure to flooding, heat stress, as well as water and air pollution, which it aims to address with NBS[6]. The Gavoglio redevelopment project has three distinct objectives:

- Reconnecting the former barracks site with the neighbourhood. This includes creating an urban landscape in accordance with the landscape of the area, ensuring better access to the park area, as well as creating connectivity to the sea.
- Enhancing the urban nature capable of mitigating and adapting to the effects of the climate change. This implies incorporating storm-water management elements, such as permeable surfaces, and planting lines of trees.
- Creating inclusive and multifunctional public space. This involves installing features that would allow access to all age groups, promote cohesion and enhance the sense of place for the surrounding neighbourhoods.

Procurement objectives

The objective of this public procurement was to source a supplier who could redevelop the former military barracks area into an urban park incorporating NBS. The project involved creating new green spaces, while ensuring their connectivity to the existing green infrastructure. It also aimed to include urban gardening elements as well as water management measures.

The public procurement of NBS was executed in a similar fashion as other public works in Genoa, hence an open tender procedure was chosen. Around 40% of the contract value was foreseen for the interventions containing greenery and urban furniture, in addition to construction, engineering and earthworks. The contract included all the works, services, and supplies necessary to redevelop the Gavoglio area. The special tender specifications listed the technical, qualitative and quantitative characteristics. The tender was published in 2019.

Market engagement

Prior marker consultation with the private sector was not held, however, the tender itself followed an open, digital procedure pursuant to Article 60 of Legislative Decree no. 50 of the Italian Public Contract Code 18/4/2016. Any company satisfying the tender requirements could compete for the contract.

Community engagement

The public procurement process itself had little community engagement, however, the local community was actively involved in the co-creation process of NBS, where they had a chance to exchange ideas, develop visions and the desired functions for the new Gavoglio area. These were then translated into NBS when defining the features of the urban park.

Criteria used

Environmental and sustainability considerations are included in the special tender specifications. They refer to the stringent regulation concerning Minimum Environmental Criteria (MECs) for services and works for the new construction, renovation and

[6] https://unalab.eu/en/our-cities/city-genova

maintenance of public buildings, purchase of the street furniture, lighting, and public lighting systems, as well as environmental criteria for the soil, and plants procured. It also includes requirements for the management of the waste generated as a result of construction and "directly and / or indirectly generated by all the activities covered by the contract".

The MECs have been developed as part of the National Action Plan for Green Public Procurement in Italy. The MECs are "fully applied" to the contract, meaning they need to be incorporated in the offers. In addition, ISO and UNI standards must be followed for the construction materials.

While the technical specification document required the submitted offers to fulfil the MECs, the prevailing award criteria in this tender is the lowest cost. Additionally, the contractor is required to provide maintenance of green elements until the standard criteria-based approval test is performed by the municipality. Upon the successful completion of the approval test, the city will take over the maintenance operations.

Results

The call for tender was successful. There were 24 bidders, out of which one was selected according to the lowest cost criterion. The awarded contract duration is 360 days.

Even though the type of works procured could be deemed as "rather unusual" by the local supplier ecosystem, the relatively high number of participants would suggest that the awareness and the capability to deliver NBS is rising.

Environmental impact

The project is aiming to address the following environmental challenges:

- Air pollution
- Lack of public green spaces
- Water scarcity
- Heat stress
- Biodiversity loss

The project aims to preserve the surrounding historical and cultural heritage and the characteristics of landscape typical of the Ligurian region. Different species of bushes and trees (including varieties of oak) could be found in the area before the start of the project. However, they were very poorly maintained. The city aims to preserve the already present native species by ensuring gradual thinning and adapting naturalistic forestry approach without unnecessary vegetation replacements. It expects to see a gradual recovery of the local ecosystem especially in terms of limiting pest control and invasive species. Additionally, multiple storm water management components installed in the park are expected to mitigate the risk of flooding and enhance local water supply.

Social impact

The project increases green space accessibility for inhabitants of all age groups in the Lagaccio district. It incorporates recreational infrastructure to encourage physical activity, as well as socialisation and interaction between the residents of the district and city visitors.

LESSONS LEARNT- GENOA

According to the city representative, this project has **provided a valuable opportunity for the different municipal agencies and departments to collaborate**. Additionally, it has **inspired the city administration to include NBS among the requirements** for the design of another urban park for the city of Genoa.

Subject to an international design competition, "The Park of the Bridge" will be located in the areas affected by the infamous collapse of the Morandi motorway bridge, which is now the site of the reconstruction. **UNaLab project experience was an important source of inspiration for the drafting of the guidelines set by the city administration at the base of the design competition**, and these guidelines were implemented extensively by the winning project

Figure 7: Former military barracks in Lagaccio district. © UNaLab

7.3 Eindhoven, Netherlands: procurement of a city square greening and rainwater management

Background

Deep Dive Case Study introduction: Eindhoven	
No. of inhabitants in the city	230,000

Procuring authority	City of Eindhoven
Project site	Clausplein square: a paved city square
Types of NBS procured	Green elements (trees, bushes, etc.) and water management system
Size of NBS procured	2000 m^2
Length of the contract	3 years
Project value	€500,000
H2020 project	UNaLab (Urban Nature Labs)

Eindhoven is the fifth largest cities in the Netherlands, which is expected to grow in the coming decade due to the strong economic performance of the region.

Consequently, the city experiences numerous challenges due to rapid urbanization, such as urban heat stress, air pollution, and flooding. The city has started implementing NBS to help address these pressing urban challenges, including initiating the redevelopment of Clausplein Square in pursuit of a more pleasant, greener and climate-robust square.

Procurement objectives

The procurement exercise was performed to ensure the successful redevelopment of Clausplein Square incorporating underground storm-water storage as well as installing green elements such as trees, plants and grass. Clausplein is also the roof of an underground parking garage, meaning that a rather innovative approach was required to meet the safety, environmental, as well as functional needs of the redevelopment.

A closed tender procedure was chosen by the city, which invited four companies to submit bids. The city required the companies to submit documentation highlighting their vision for managing the cooperation between the municipality and construction companies, as well as provide a risk and opportunity assessment for Clausplein.

Market engagement

Preliminary market consultation was held, where the procuring authority invited companies to share ideas and demonstrate experience with similar development projects as envisaged for Clausplein.

Community engagement

The design of the square was developed in consultation with local stakeholders, including the representatives of the residents and local entrepreneurs. Additionally, local community was actively involved in the co-creation process of NBS, which encouraged them to define the vision and potential elements of NBS in Eindhoven collectively.

Procurement criteria

For this project, the municipality of Eindhoven used the Best Value approach. The potential suppliers were encouraged to consider how to achieve the maximum value given the

available funds. The definition of value could include social, economic, and environmental factors. For the Clausplein project, the municipality has specified the following overarching guidelines:

- The number of square meters of green including the number of trees needed to be optimised
- The accessibility and social safety of the area was optimised as much as possible
- Establishment of an underground water storage on the existing parking basement, in which the roof water of the Witte Dame could drain
- The underground water storage could function as a water supply for the plants above
- The deck structure was such that the growth conditions of the plants and trees are as optimal as possible
- The growth location of the existing trees should be improved in favour of the vitality of the trees
- The location of the new plants and trees was required to be optimally arranged

In addition, the proposed construction works needed to incorporate the 'Green Deal Sustainable GWW 2.0'[7] and the City's 'Manifesto of Socially Responsible Procurement 2017-2020'[8]guidelines in the construction process. These guidelines aim to promote sustainability throughout the entire tendering procedure, as well as encourage the application of the Socially Responsible Procurement for the realisation of policy goals. Further elaboration of the circularity and sustainability must be included within the construction team in the design and implementation agreements of the project.

The tender had two phases – in the first phase the bidders had to elaborate the potential risks and opportunities associated with the Clausplein, as well as propose an effective cooperation mechanism between the construction team and the municipality. In the second phase, the bidders had to demonstrate their ability to optimise the technical and environmental requirements, which are mentioned above.

Results

The tender was successful and a company was hired for a period of one year. According to the representatives of Eindhoven, although the invited bidders had minimal experience in environmental design in the context of climate-resilient squares and/or streets, the participants of the closed tender were able to meet the needs of Eindhoven.

Environmental impacts

Thanks to the project, the square now host 15 new trees and the addition of recycled plastic crates to collect and store the storm-water underground means that water can be reused for irrigation purposes[9]. By implementing this NBS solution, Eindhoven tackled the following urban challenges:

- Biodiversity loss
- Air pollution

[7]https://www.greendeals.nl/green-deals/duurzaam-gww-20
[8]https://www.pianoo.nl/sites/default/files/media/documents/Manifest-MVI-Actieplan-Technische-Universiteit-Eindhoven.pdf
[9]https://www.ed.nl/eindhoven/prins-clausplein-eindhoven-met-groen-en-waterberging-is-straks-mini-airco-voor-binnenstad~a4bf81ed0/

- Urban heat island effect
- Risk of flooding
- Densification

The city expects to experience temperatures above 30°C more frequently, hence the importance and demand for green spaces is growing. Green oases such as as Clausplein have been referred to as "mini-aircons for the city"[10]. Clausplein should decrease the load on the city's rainwater sewer system by absorbing and storing water. It will also help tackle the water scarcity during hot days by pumping the water back up and using it for irrigation. The city has paid a lot of attention to designing a climate-adaptive system[11]. The biodiversity is also enhanced by incorporating numerous species of plants into the square.

Social impacts

The project increases green space accessibility for the inhabitants of Eindhoven. It has set an example of replacing a completely paved square with greenery and climate-smart design, which provides cooling (once the trees reach sufficient height) and strengthens the sense of place. The city representatives intend to explore the possibilities of incorporating green elements in other paved areas in the inner city.

LESSONS LEARNT- EINDHOVEN

Because of their multi-functionality, NBS projects often imply high levels of complexity and uncertainty. According to the city representatives, such **projects call for a high degree of interaction with the market and local communities.** An overarching **municipal procurement strategy incorporating recommendations on different procurement approaches and procedures would facilitate the implementation of such projects**.

Figure 8: Storm water capture measures in Clausplein. © RV, www.ed.nl

[10] https://www.ed.nl/eindhoven/prins-clausplein-eindhoven-met-groen-en-waterberging-is-straks-mini-aircovoor-binnenstad~a4bf81ed0/

[11] https://www.kekkila-bvb.com/article/rooftop-garage-clausplein-eindhoven-in-netherlands/

Figure 9: New green elements in Clausplein. © Kekkilä-BVB

7.4 Tampere, Finland: framework agreement to procure stormwater management planning

Deep Dive Case Study introduction: Tampere	
No. of inhabitants in the city	225,150
Procuring Authority	City of Tampere
Project site	City-wide
Types of NBS procured	Storm-water management
Size of NBS procured	N.a. – planning services have been procured in this case study
Length of the contract	4 years in total
Project value	€600,000
H2020 project	UNaLab (Urban Nature Labs)

Because of climate change, Finland expects to see an increase in precipitation in coming years of around 25%[12]. Therefore, the City of Tampere aims to implement measures that would help manage the storm water as well as address the risk of flooding. Tampere's main demonstration site for NBS is the district of Vuores, which is a new city district surrounded by natural water bodies. Vuores is home to around 13,000 people.

Vuores hosts one of the largest storm-water management systems in the Nordic countries. This system is the northernmost in the world. Vuores nature-based storm-water management system consists of retention ponds, swales, wetlands, and streams that retain and purify the water before it enters Lake Koipijärvi[13]. The nature-based water management system also includes plots where green roofs, rain gardens and rainwater harvesting serve both water management and recreation purposes.

As the city grows and the land use change occurs, the city's need for storm-water planning and surveys is growing. In connection with land use planning, a general storm-water management plan needs to be prepared, which examines the effects of land use changes

[12] https://unalab.eu/en/our-cities/city-tampere
[13] https://unalab.eu/en/our-cities/city-tampere

on the hydrological conditions of the area and the possibilities of mitigating potential flooding. Rainwater quality management is also particularly important in the catchment areas of sensitive water bodies, in which case the planning involves taking into account both the quantitative and qualitative factors of storm-water management.

In this context, the municipality of Tampere has commissioned three services:

- Storm-water management planning
- NBS construction
- NBS maintenance

As the municipality has a long-standing tradition of relying on municipal enterprises when it comes to construction and maintenance services, an in-house company was retained for the construction and maintenance of the project. The external procurement exercise therefore only related to the storm-water management planning services.

Procurement objectives

The competitive tender procedure was initiated for planning the storm-water management system.

According to the city, there is a need to develop implementation and maintenance plans for storm-water management systems and storm-water management plans in addition to general urban planning studies. New zoning areas incorporate storm-water management structures located in public spaces. Increasing attention is being paid to the management of storm-water during construction. The city's aim is to ensure the efficient planning and implementation of storm-water management to limit pollution of waterways. However, the desired storm-water management plan should not only cover new construction sites. There is a strong need to develop management approaches for the existing areas, yet that might prove challenging due to lack of space for management systems.

The goal of this public procurement exercise was to obtain storm-water plans and expert services to implement sustainable storm-water management solutions. The city preferred economically feasible solutions that improve the state of quantitative and qualitative performance of storm-water in the long term. The hired consultants were also required to demonstrate expertise in research translations (e.g. developing illustrations and presentation material that could be understood by non-experts).

The goal for this tender was to select five companies who would be awarded framework contracts. This tender was issued in 2016. The framework agreements implied that the companies would also be providing planning services to the NBS implemented under the Horizon 2020 UNaLab project.

Market engagement

The city's storm-water specialists and the public procurement specialists drafted the call for bids collectively. During the call for bids actors had an opportunity to raise questions. These questions and their corresponding answers were visible for all actors on a procurement information system.

Community engagement

The public procurement only related to planning services, and no element of community engagement was included in this. However, as part of UNaLab project, co-creation activities took place in Tampere where residents of the Vuores and Hiedanranta districts, NGOs,

private sector representatives and other relevant stakeholders worked together to define the vision and desired elements of NBS[14].

Procurement criteria

Emphasis has been put on the expertise of the participating companies. The general criteria required the project manager and designer positions to have at least 3 and 4 years of relevant experience respectively. The companies were requested to demonstrate expertise across the following areas:

- Hydrological impact assessment and storm-water management plans for land use planning
- Rainwater management plans during construction
- Implementation plans and studies for the development of existing storm-water systems
- Expert services related to the economics and management of storm-water management

Preference was given to the bidders who could demonstrate sufficient experience and references of having completed assignments of storm-water management planning in municipalities with at least 50,000 inhabitants, sites with significant hydrological impact, robust track record of storm-water quality management and troubleshooting, and storm-water network modelling. The techno-economic feasibility of solutions, as well as experience working with cross-sectorial teams was accounted for as well.

The criteria that were used when selecting the successful bidders included the a) total price; b) customer satisfaction survey results; c) references of project managers and designers. The price criterion accounted only up to ~35% of the weight, whereas the rest of criteria constituted the remaining ~65%. The City of Tampere sought to procure the best value available on the market.

Results

Six companies competed for five framework agreement contracts. The suppliers were all able to meet the requirements to varying extents, although some criteria proved to be slightly difficult to assess in practice (e.g. the bidders were required to demonstrate that the project manager had worked on a significant storm-water design site at a national level, however, there are few nationally-significant sites). Overall, the tender was deemed successful. The resulting two-year framework agreements ran from 2017 to 2019 with a possibility of extension.

Environmental impact

The framework agreements do not oblige the contractors to deliver specific environmental or social benefits. However, the resulting NBS is expected to help the city address these challenges:

- Biodiversity loss
- Densification

[14] https://www.ril.fi/fi/rakennustekniikka/teemat/co-creating-nature-based-solutions-in-eu-project-demonstration-city-tampere.html#52092106

- Flooding
- Water pollution

The planned interventions would result in better quality of storm-water, as well as less pollution of waterways and water bodies. The city would like native, wild plant species to be used at NBS sites, which are aligned with Nordic climate conditions, as well as enhance local biodiversity.

Social impact

Recreational and educational aspects of NBS have been crucial too. The City of Tampere has initiated educational activities for children. The local school in Vuores district received water examination backpacks, where one could find equipment to measure the pH level, turbidity, oxygen, visual depth, temperature and algae levels of the water[15]. The children were also encouraged to observe and identify the local insect species.

In addition, the City of Tampere has rolled out innovation vouchers for local housing co-operatives and other communities to improve plot-scale NBS and overall performance of holistic decentralised storm water management system. Eligible solutions should also combine recreation, food production and/or biodiversity preservation and social connectivity targets[16].

LESSONS LEARNT- TAMPERE

- Using **framework agreements** can help ensure a better availability of suppliers. The municipality asks for bids in every second (or fourth) year. This process is very strictly regulated because of existing public procurement legislation. After the bidding process, agreements are made with four or five qualified companies. The city employs framework agreements and rotates between contractors to ensure the supply of the services can be provided when needed. This implies **certain security for the municipality and for the companies under the framework agreement**. The contractors are Finnish companies or international companies with a Finnish market presence.

- The **planning and procurement of NBS projects requires multidisciplinary inputs**. This may require various departments within a city to work together (e.g. environmental team, infrastructure team etc.), and call for a range of external expertise (horticulturists, landscape architects etc.). Whilst necessary to develop effective NBS solutions and ensure good performance, this can result in **long timescales** in the procurement process of NBS.

[15] https://unalab.eu/en/our-cities/city-tampere
[16] https://unalab.eu/en/our-cities/city-tampere

Figure 8: School children observing water parameters in Vuores. © City of Tampere, UNaLab

7.5 London, England: co-designed NBS solutions for a housing estate

Deep Dive Case Study introduction: London	
No. of inhabitants in the city	8.9 million (Greater London) 32,000 (Thamesmead)
Procuring Authority	Peabody (a housing association which manages socially-rented properties across London).
Project site	Thamesmead South: a 760 hectare housing estate in South East London. Most of the housing estate was built in the 1960s and its quality significantly degraded over time, calling for a significant redevelopment and improvement works.
Types of NBS procured	Co-designed scheme of public realm and landscaping across the estate, including community planting areas, sustainable drainage features, rainwater harvesting and biodiversity-friendly planting.
Size of NBS procured	Information not available- the project comprises multiple NBS features across the site
Length of the contract	Phase 1: 3 years Phase 2: 2 years
Project value	Phase 1: €5.4m Phase 2: €6.6m
H2020 project	Clever Cities

Figure 11: Public Realm in South Thamesmead, London © London City Council

Background

In 2014, the London-based housing association Peabody embarked on a 30-year plan to redevelop a 760 hectares housing estate known as Thamesmead. The ambition set out in the masterplan is to deliver new housing employment and recreational opportunities in the area, the condition of which has significantly degraded since residential towers were first developed there in the 1960s.

In addition to a programme of refurbishment and new construction, the project strongly focuses on improving access to green space and outdoor amenities for the local community. To this end, Peabody has developed a public realm strategy, which includes a phased scheme of public realm works in a part of the site known as South Thamesmead. The organisation went out for tender to secure a team of consultants and contractors for the Phase 1 of the project in 2017. Peabody had originally envisioned that the works would be completed in three phases. However, to shorten delivery timescales and increase the value of the contract (and therefore its appeal to the market), phase 2 and 3 were eventually merged. Contractors for this merged second/third phase were selected in Spring 2020.

- **Phase 1**: The design contract for Phase 1 (worth around £4.8 million) was signed under a direct award procedure, made possible by an existing framework agreement in place between Peabody and competent consultancy organisations. Peabody entered individual contracts with each of the consultants. The community was consulted in the design process through a traditional approach involving set public consultation periods. Pilot projects were also used to test several of the proposals with the residents before they were implemented at full scale.

- **Phase 2**: For Phase 2 (worth around £5.9 million), Peabody decided to scale up its approach to community participation, moving on to procuring a co-design approach. This initiative was supported by the inclusion in 2018 of the scheme under the CLEVER Cities project, which provided funding for the exercise. A competitive procedure with negotiation was used to procure a consortium of consultants under a lead design team. To widen its reach to potential bidders across the market, Peabody issued its call for tender through three existing suppliers database (two framework agreements and a Dynamic Purchasing System). The process started with an open call for tender, followed by interviews with the top four bidders. It ended with the successful award of the contract to a consortium of over seven organisations in Spring 2020.

The below sections explore how the phase 2 procurement process was conducted, drawing from lessons learnt by Peabody during phase 1.

Procurement objectives

The goal of the procurement exercise was to appoint a design consultant able to lead a team of contractors, residents and local businesses to deliver a high-quality scheme of public realm improvements aligned with local needs.

- **Strategic objectives**

The contractor had to demonstrate their ability to draw on Thamesmead natural assets to support the socio-economic and environmental goals of the 30 year vision for the area, namely:

- Creating a fairer, more active and happier place, with a focus on supporting the most disadvantaged and vulnerable.
- Enhancing people's connection to nature, boosting biodiversity, and building in greater climate resilience in the area.

- **Innovation objectives**

Experience gained from the procurement of the Phase 1 indicated that an approach to procurement that promoted competition between bidders would be valuable to help increase the quality of the offer. As Phase 1 was awarded through a direct award procedure under Peabody's own framework agreement, it was indeed felt that the low levels of competition did not provide suppliers with a strong incentive to innovate to deliver an offer meeting the key project objectives.

The choice of a competitive procedure with negotiation was therefore made to address this issue for Phase 2. By introducing greater competition and reaching out to a greater number of suppliers through the use of two framework agreements and a dynamic purchasing system, the process was designed to stimulate innovation among bidders and increase the quality of the offers received.

- **Management objectives**

Under the Phase 1 arrangements, Peabody had to individually manage the inputs of each of the consultancy organisations appointed to deliver the project, which was a complex and time-consuming process. For Phase 2, a key management objectives was therefore to appoint a leading design organisation that would be able to put together to coordinate and manage a project consortium. The goal was for Peabody to have a single contact point with the consortium through this lead organisation, facilitating communications and streamlining the project management process.

Market engagement

Peabody reached out to potential suppliers through two framework agreements and a dynamic purchasing systems of which they were part. This ensured that it could reach out to a large number of organisations.

In the call for tenders, interested suppliers were encouraged to join one of the three site visits organised to show them around the estate and answer any questions.

The site visits were a success. A high number of organisations took part and engaged in discussions with Peabody. Most of the questions asked by interested parties focused on the works that took place in Phase 1 and lessons learnt from it.

Community engagement

The area targeted for the project are home to around 2,000 inhabitants. Community consultation efforts, however, mainly focused on Peabody's own tenants, representing around 30% of the estate's population.

- **Phase 1 engagement**

At the start of Phase 1, the community was approached to help inform the design brief in the tender. However, most residents suffered at that time from a certain degree of "consultation fatigue", caused by a previous landlord which had put forward several proposals for the area without delivering any of them before Peabody took on the management of the estate in 2014.

Throughout Phase 1, Peabody's focus was therefore on building trust within the community. This was achieved through regular engagement with residents and established community groups the estate, ensuring that any commitments made during those discussions were translated into concrete action. For example, the community was invited to give feedback on several NBS pilot projects, and their views were reflected in the design of the final proposals. This helped building a relationship with the residents, demonstrating Peabody's commitments to delivering the improvements that it promised.

- **Phase 2 engagement**

In Phase 2, Peabody and its advisors will be able to build on the trust built within the community through phase 1 to support the co-design process. Building on lessons learnt in the first phase, the community engagement proposals of the winning consortium included the following elements:

- The co-design process will include continuous community engagement activities. In phase 1, consultation initiatives were limited to fixed periods tied to specific elements of the technical proposals. This sometimes led to significant delays between the time when the community was engaged and the moment when the proposals were delivered e.g. residents had forgotten about the pilot by the time the full proposals got off the ground. This created a disconnection between the engagement activities and project delivery, which a more continuous approach to community participation should help address.
- The engagement exercise will focus not only on individuals, but also on the numerous community groups established within the area (e.g. an elderly knitting group etc.).

In times of Covid 19, the consortium had to propose innovative ways to run the co-design process whilst maintaining physical distancing requirements. The resulting proposals will include a mix of digital and live activities, including small-scale group activities that promote social interaction whilst supporting physical distancing.

Procurement criteria

In the evaluation of the tenders, price and quality were respectively given a 25% and a 75% weighing.

The quality evaluation was based on five questions, given the following weighing:

- Team structure, leadership and capabilities (15%)
- Track records and previous experience running co-design processes (15%)

- Co-design methodology (45%): bidders were asked to explore innovative approaches to running the co-designing process. They were asked to focus on the long-term, designing a system which could be continuously used to involve the community in maintenance and future public realm interventions

- Programme (12%): bidders were asked to set out their programme for putting a team together and running the co-design process, leading to a start on site within 18 months of appointment

- Corporate responsibility (13%): bidders were asked to demonstrate how they would support and enhance Peabody's existing community investment programme. They were encouraged to consider options for pro bono work, sponsorship, volunteering and delivering their own Corporate Social Responsibility (CSR) activities for the benefit of the residents of Thamesmead

Results

The procurement exercise attracted a strong response from the market, as 11 consortia submitted a bid and 4 were selected for interview.

The selected consortium stood out at the interview phase through the demonstrated expertise of the lead contractors in the area of co-design, and the track records of all of the consortium members in working together to deliver comparable projects.

The team includes over seven organisations, including programme manager/ consultants, landscape architects specialised in NBS, designers, co-designs specialists, engineers, lighting designers and wayfinding/ signage experts.

Environmental impact

The new public spaces should enhance the ability of the area to deal with the impacts of climate change. It is anticipated that the co-designed solutions will provide cooling and shade elements, sustainable drainage features and rain water harvesting arrangements.

The winning consortium included ecology specialists, who will help ensure that planting and maintenance arrangements increase biodiversity in the area. It is also anticipated that the full involvement of local stakeholders in the design process will increase environmental awareness in the community.

Social impact

- **Wellbeing and empowerment**

The co-design process will empower the community to re-invent public spaces in line with their needs. Better and safer spaces should improve quality of life by allowing people to spend more time outdoors, whether to travel, socialise and exercise or to relax. The improved look and feel of the area should contribute to improving its image, fostering a sense of pride and cohesion among residents. The proposals made by the selected consortium included several light touch interventions to improve the feel of the place, such as a colourful lighting scheme and a comprehensive way-finding/ signage plan.

The co-design process will also allow residents to come together to discuss shared issues, both fostering a sense of community and enabling individuals to develop employable skills in decision-making, negotiation and leadership.

- **Training, education and job opportunities**

Bidders were encouraged to submit proposals which aligned, complemented and enhanced Peabody's existing programme of community activities. The goal was to ensure that the direct socio-economic opportunities created by the project could be captured for the benefit of local people and businesses.

The project brief invited bidders to consider a comprehensive list of potential interventions in their CSR proposals. Those included the following:

- Creation of apprenticeships for local residents
- Opportunities for local residents to apply for any vacancies arising within the winning consortium's team
- Commitment to engage with local business forums and use local businesses in their supply chain
- Development of school engagement and sponsorship activities
- Financial or in-kind contributions to established local community-led initiatives

LESSONS LEARNT- LONDON

- **Choosing the right procurement procedure to foster competition**: NBS projects, in particular those including co-design elements, are still relatively new on the market. High-quality turnkey solutions are therefore rarely available, so that innovation to develop bespoke solutions that are suitable for a project is often key to success. Peabody's experience with Phase 1 shows that procuring suppliers through direct award procedures is unlikely to give contractors sufficient incentives to develop innovative solutions for complex project requirements. A competitive procurement procedure is likely to add significant value by helping to select solution suppliers which are most suitable and committed to the project.

- **Ensuring sufficient contract value:** For NBS projects of a significant scale that require the involvement of a large team of contractors, it is helpful to ensure that the contract value is sufficient to attract interest from the market. In Thamesmead, the decision to merge Phase 2 and 3 of the project helped increase the contract value, and therefore its visibility and appeal to potential suppliers.

- **Using a single point of contact for project management**: large NBS projects tend to require the services of large multi-disciplinary consultancy teams. In Phase 1 of the Thamesmead project, this led to complicated and time-consuming project and contractor management processes. Inviting suppliers to bid as consortia whose lead is in charge of managing the work of other consultants can help simplify the management process for the bidding authority.

- **Knowing your objectives for the community**: Having a community strategy in place prior to the procurement exercise helped steer bidders' social value proposals in the right direction and promoted high standard of offers in terms of CSR and co-design processes.

- Focusing on **continuous community engagement and short term successes** to build trust: the main barrier to public participation observed by Peabody in Phase 1 of the works was a lack of trust from residents in their commitment to deliver on their promises. Before getting started with the full co-designed NBS process planned for Phase 2, it was therefore essential to foster engagement within the community by building trust. In Phase 1, running small NBS pilot projects before the delivery of the main scheme helped achieve that by showing the community that their feedback was valued and directly used in order to inform and improve the pilots. Before entering a large-scale NBS co-design process, it is therefore key to gain trust and interest from the community through continuous engagement. Short-term successes that demonstrate the commitment of the procuring authority to listen, deliver and act on feedback from the community can be highly valuable to this end.

- **Piloting NBS projects** before full implementation to inform technical proposals: site-specific characteristics, such as ground conditions, can strongly impact the feasibility of difference NBS proposals in a given location. In Thamesmead, testing proposals through a series of pilot projects added value by allowing the team to develop proposals which were fully suited to both the characteristics of the site and the expressed preferences of the local community. Whilst piloting several solutions can increase upfront costs, it is likely to lead to cost savings in the long-term by increasing the longevity of the solutions delivered and reducing maintenance needs.

- **Engineering expertise is key for NBS projects:** as the market is still developing capacity and skills to deliver NBS projects, it can be difficult to find suppliers with significant experience in this field. Experience gained from Phase 1 of the Thamesmead project, however, shows that it is essential to ensure that the engineering team selected for a project has some experience of the type of NBS being proposed. Lack of engineering expertise with the features proposed in Phase 1 led to costs and quality issues which would have been avoidable by a more experienced project team.

- **Recording lessons learnt**: To improve the ability to learn from challenges and replicate successes, there is value in continuously compiling lessons learnt over the lifetime of a complex project. Given the innovative nature of co-designed NBS projects, projects tend to drive a steep learning curve. In complex projects with long timescales, it might be challenging to remember all the lessons learnt in a final evaluation at the end of the project if they have not been compiled regularly. Recording all lessons learnt as they arise will therefore help keeping track of successes and challenges over a project's lifetime.

7.6 Frederiksberg, Denmark: Innovation Procurement of Sustainable Urban Drainage Systems

Note: this case study was authored by ICLEI as part of the European Commission's GPP Helpdesk. It was originally published in Issue number 91 of the European GPP News Alert (June 2020)[17]. Minor modifications have been made to better integrate it within the report.

Deep Dive Case Study introduction: Frederiksberg	
No. of inhabitants in the city	105,000
Procuring Authority	The Municipality of Frederiksberg
Project site	City-wide (test projects will be replicated across the city)
Types of NBS procured	Sustainable Urban Drainage System • Solution 1: innovative tree-based water retention basins • Solution 2: innovative street drainage mechanism capturing and storing excess rainwater to water trees
Size of NBS procured	No details available
Length of the contract	4 years
Project value	Solution 1: information not available Solution 2: €1,866,600.
H2020 project	n/a – city-funded

[17] http://ec.europa.eu/environment/gpp/pdf/news_alert/Issue_97_NewsAlert_June_2020.pdf

Figure 9: New SUDS in Frederiksberg, Denmark © Frederiksberg City Council

Background

The Municipality of Frederiksberg, with a population of over 100,000 people, is one of 29 municipalities which make up the Capital Region of Denmark. Like many European cities, Frederiksberg is challenged by heavy rainfall combined with an old sewage network not designed to handle the amount of water it now receives. This leads to urban flooding, like on the 2nd July 2011, when large parts of Frederiksberg were left under water after 135mm of rain fell in a very short period. The risk of urban flooding is likely to increase as climate change alters rainfall patterns. To protect against future flooding, the Municipality has launched a number of projects to improve rainwater management. By improving the city's 'green' and 'blue' infrastructure (such as vegetation and water features) rainwater can be captured, and its flow can be diverted from sewers or slowed down.

Procurement objectives

The Municipality aims to handle 30% of rainwater 'locally', meaning, without relying on the sewage system to drain water from streets. Its strategy for handling heavy rainfall also aims to ensure that there is no more than 10 cm rain on the ground at any time in a cloudburst situation.

Between 2016 and 2036, it has allocated almost €300 million (2.2 billion DKK) to meet those two goals, 15-20% of which is reserved for developing innovative new future-proof solutions.

As an ideal solution suitable for dense city streets was not yet available on the market, Frederiksberg used an innovation partnership model in order to procure a customised solution for heavy rainfall management. An innovation partnership approach allows research and development activities to be combined with a purchase, in a way which adheres to procurement rules around equal treatment and transparency (as set out by Art. 31 of Directive 2014/24/EU). This approach involves three phases:

- A competitive phase, where suitable partners are selected;
- A research and development phase, where the solutions are developed in collaboration with the contracting authority; and a commercial phase, where the selected partner(s) provide the final product or service.
- A final phase, in which the contracting authority has the right, but not obligation, to purchase additional units for further deployment

Community engagement

Before going out to tender, Frederiksberg commissioned a survey to raise citizens' awareness about the issue of cloudburst / heavy rainfall and what the city is doing to address it.

During the implementation of the contract, the city held meetings with the citizens in the area where the solutions were introduced by the private companies to answer any questions about the works.

Market engagement

Prior to the competitive phase, in February 2017 Frederiksberg conducted a market dialogue with different market actors, including companies, universities and others, in order to make sure their approach reflected state-of-the-art knowledge. Over two days of market dialogue, participants were introduced to the innovation partnership concept, including the benefits, risks, conditions and financing. Interested parties were invited through an open call to submit requests for pre-qualification. Only pre-qualified bidders could submit bids, which would then be subject to negotiation.

By focusing more time and resources up-front, Frederiksberg aimed to ensure that the new solutions developed through the innovation partnership could be purchased directly at the end of the process, without having to do a further procurement procedure to upscale their preferred solution. The resulting tender focused on functional specifications, such as the amount of water which should be caught by the system, and the need for continuous watering of tree

Procurement criteria

Criteria type	Description
Subject matter	Innovation Partnership for developing, testing and implementing water management solutions.
Selection criteria	To ensure technical and professional ability of selected suppliers, applicants had to submit between one and four references demonstrating the execution of relevant research and innovation projects within the past three years. A research and innovation project was considered relevant if it resulted in the applicant launching an innovative product or solution on the market. Such projects may be funded by the applicant's own resources, or funded

	partly or in full by a third party (including grant money or customer payments). In addition, the applicants had to submit one reference for construction work
Technical specifications	In order to encourage innovative solutions, technical specifications focused on minimum functional requirements, including: Solutions are able to withhold at least 0.5 cubic meters of rainwater from the sewage network per meter of road Solutions can remove water from the roadway in heavy rainfall (15 mm per half hour) within a 30-minute period Solutions can be established in the existing road structure (in a densely built-up area) and be built within a maximum of five weeks at junctions and three weeks in road sections Solutions can withstand heavy traffic (annual average 3500 passenger trucks and 300 trucks per day); Solutions comply with applicable technical, environmental and regulatory requirements; Solutions must cost no more than €1140 (8500 DKK) per 0.5 cubic meters of water handled. This price was agreed in collaboration with the water utility company which is in charge of the sewage system.
Award criteria	Contracts for the development phase were awarded on the basis of best price-quality ratio, applying the following criteria and weightings: 1. Potential for effectiveness (50%): the extent to which the solution meets the described challenge. 2. Deployability, including flexibility and modularity (20%): the extent to which the solution can be deployed in dense areas, in a short timeframe without significant disruption, as well as its scalability and maintenance requirements. 3. Robustness in project execution (20%): the extent to which the supplier has demonstrated its ability to develop the innovative solution in the stipulated time frame, understand the contracting authority's needs and involve stakeholders, and apply employee competence and safety considerations in project execution. 4. Maximum price for the solution (10%). The first three criteria were assessed according to a 1-10 scale, where 10 points were awarded for proposals which met the criterion with no or a few insignificant exceptions, and 1 point for proposals with an unsatisfactory fulfilment of the criterion. A formula for comparing prices was included as an appendix, in which the lowest maximum price is awarded 10 points, while a maximum price twice as high as the lowest price is awarded 5 points, and 10 times as high is awarded 1 point

Results

Frederiksberg expected five consortiums to apply, and in the end, exceeded this by receiving expressions of interest from eight. Five consortia were invited to enter negotiations, and four accepted the invitation. Of these four, one was not able to meet the minimum requirements presented in the tender. Contracts were signed in November 2017 with two bidders to develop solutions.

- First solution

The first solution was an easy-to-build flexible system for storing water in small retention basins, and using this to water city trees. The retention basins are dug into the city's streets and lined with a membrane. The basin is filled with gravel, compacted mulch able to carry traffic loads, and plastic cubes, which together create a "sandwich" of different layers. On top of all this, a tree is planted. Thanks to the sandwich construction, capillary watering is provided to the top layer of the basin in the first four years. After this, when the trees roots are deeper, the sandwich construction delivers water to the lower level. After heavy rainfall, a sustainable drainage system (SuDS) flow regulator is used to release water from the retention basin slowly over a 24-hour period.

- Second solution

The second solution channels surface water from roads through a cleaning device, and then into a system which waters city trees. After this, it flows into a number of underground 'delay tanks' which release into existing drains. In order to ensure that the existing drain system is not overloaded in a storm surge situation, the release from the reservoirs is delayed to match existing capacity in the drain network. Both solutions were co-developed with the municipality, and were tested at the same time in the same locations, which were selected as representative of the majority of city streets where the solution would be deployed.

As both consortiums managed to develop useable solutions, the municipality now has the option under the framework agreement to buy additional products and solutions from both for the next four years without conducting a separate tender. As part of the contract signed with both consortiums, further development will continue over the next four years, with the goal of increasing the effectiveness and decreasing the price. In addition, four other municipalities and utility companies have signed an option of purchase based on the innovation partnership contract, enabling them to use the same framework agreement to purchase new solutions for their city. Together, the value of the contracts is €1,866,600.

By using an innovation partnership approach, the city acquired an effective system which was cost effective and implemented in a short amount of time. It took just 20 months from the market dialogue in February 2017 to the solutions being implemented in October 2018. This was the first Innovation Partnership to be completed in Denmark, and second in Europe. As a result of this successful approach, Frederiksberg one the Innovation Procurement of the Year prize in the 2019 Procura+ Award.

Environmental impact

Each retention basin can take up as little as 0.8 m^2 of space, providing flood mitigation and also supporting a greener city. Using rainwater to water trees reduces operation and maintenance costs of city trees during dry periods (saving time, water, and CO_2 in terms of the trucks used for these maintenance operations), and reduces pressure on existing drainage networks by diverting water through transpiration (evaporation from trees). Trees in city streets also provide shade and cool down the city on hot days.

LESSONS LEARNT- FREDERIKSBERG

- Co-development was a key factor in the success of this procurement. Using an innovation partnership model allowed the municipality to combine its knowledge and experience with other actors and find innovative solutions which meet the municipality's specific needs. The fact that dialogue with private companies was possible beforehand and throughout the tender made it possible to create much better solutions.
- An important lesson was that the model should be explained many times, and expectations should be repeatedly addressed. Co-development is a new way of working, and requires a shift in mindset.
- As this was one of the first times the innovation partnership model has been used, Frederiksberg engaged an external legal expert to help handle the co-development process. This increased the upfront costs of this procedure. However, in the long run, the municipality expects to save money, as it will not need to run another procedure for several years, and it can choose from two custom made solutions already tested in situ.

SUGGESTED ACTIONS TO FACILITATE NBS PROCUREMENT

8 EU RECOMMENDATIONS

Action	Description
i. Continue to provide funding for NBS pilot projects	As budgetary constraints continue to exist for NBS at the local level, the EU can strongly encourage NBS procurement activities through project funding. By unlocking pilot or flagship projects, EU funding will allow local authorities to experience the benefits of successful NBS projects directly. This may lead to greater institutional buy-in for NBS projects and help unlock budgets.
ii. Support the development of key NBS performance indicators	According to the workshop participants, the availability of key performance indicators (KPIs) that would measure the success of NBS interventions is crucial. KPIs measuring the environmental, social, and economic performance of NBS would enable the practitioners to better grasp the holistic value of NBS. It is therefore recommended that the European Commission should support initiatives seeking to develop such a set of KPIs.

	Also, the experts expressed their belief that once the KPIs are available, it would be easier to convert the effects of NBS into monetary terms. The expected performance of NBS in terms of for example energy savings, health expenditure savings, and flood mitigation savings could then be transferred into the contractual agreements, following a "performance-based" contract model. A potential way to define such indicators could be to gather the data from the existing NBS pilot projects. Similar initiatives are underway. For example, the representatives of the European Commission Task Force 2 NBS Impact Evaluation Framework[18] are working on a Handbook of Performance and Impact Evaluation of NBS. This Handbook aims to provide a list of qualitative and quantitative indicators to monitor and evaluate the impacts of NBS.

9 ACTIONS FOR NATIONAL GOVERNMENTS

Action	Description
iii. Review health and safety regulations	National health and safety regulations may impair cities' abilities to involve communities in the development and maintenance of NBS. Without community involvement, the potential of NBS projects to deliver social value may be reduced, and cities may lose opportunities to reduce the maintenance costs that they face. This could weaken the case for NBS projects, adversely impacting public procurers' abilities to drive them forward. National governments should, therefore, be encouraged to review their health and safety legislation, amending provisions as required to facilitate public involvement in the delivery of NBS projects. Consultation with local authorities, community involvement specialists and NBS experts will be essential to determine how public participation methods can be reinvented to meet physical distancing requirements in times of Covid 19.
iv. NBS brokers	In some countries, there are "innovation brokers" who specialise in finding innovation-driven solutions based on the needs of governments. A positive move for NBS would be to appoint such brokers specialised in NBS. The role of NBS brokers could include advocating the value of NBS, promoting knowledge transfer, and dissemination, helping to break barriers to NBS procurement within city administrations.

[18] https://platform.think-nature.eu/

v. Create centres of excellence on NBS procurement	National or regional centres of excellence for procurement could encourage a more holistic approach to NBS procurement. Establishing a central team collecting the best practices of procuring NBS would inform and advise the implementation process on the best available technology. This centre could advise the procurement offices on available technologies and specifications that would promote NBS solutions. A centre of excellence on NBS procurement could be built on the model of similar organisations, including a centres of excellence on procurement include: • The Competence Centre for Innovative Procurement (KOINNO) established by the German Federal Ministry for Economic Affairs and Energy. This centre provides consultation and education on innovation-based public procurement. It is an online platform where numerous publications and tools are available to guide public buyers in formulating innovation-driven procurement processes. • The 10 national centres of excellence on innovative procurement represented in the Procure2Innovate Network The development of similar platforms aimed at NBS procurement could be very useful to educate the public procurement officers on how to make the procurement process more NBS-friendly.

10 ACTIONS FOR CITY ADMINISTRATIONS

Action	Description
vi. Provide policy support to NBS projects	In order to justify the inclusion of NBS features within the procurement of infrastructure projects, local budget policies often require public procurers to demonstrate a strong business case it. As they do not always have the tools or expertise to assess the wide benefits of NBS (social, environmental etc.), the economic/financial case may often be difficult to demonstrate. It is therefore of key importance that they are able to rely on a strong strategic case for their NBS proposals, rooted in supportive policies. By developing and adopting a set of policies that explicitly support NBS projects, city governments can encourage public procurers to include NBS requirements in calls for tenders. This is key to facilitating NBS procurement in cases where the financial case is difficult to demonstrate.

vii.	*Promote cross-departmental exchange*	The implementation of NBS often calls for interdisciplinary knowledge and skills. Multidisciplinary teams could help increase the awareness of public procurement officers about NBS features, functions, and suitability for addressing the contemporary urban challenges. It would also help the city administration officials and a wider audience of stakeholders better understand NBS-friendly procurement processes, specifications, and requirements. The cross-departmental exchange could be implemented in a form of creating cross-departmental units (e.g. sustainable city department) and/or exchange occasions within the city administration (e.g. workshops and informal events). It could also imply involving the procurement officers in public discussions and events on NBS. Such knowledge exchange has the potential to address the silos and encourage the involvement of the relevant actors along the NBS implementation process.

11 ACTIONS FOR PUBLIC PROCURERS

Action		Description
viii.	*Adopt challenge-based thinking in calls for tender*	Given the complexity of city needs and the wide range of technical solutions available for NBS, public procurers may face difficulties in writing clear technical specifications for their projects. It may therefore often be better to adopt a challenge-based approach to procurement, specifying only desired outcomes in the call for tenders and asking suppliers to come up with their ideas on how to address those. Those objectives can be specified in the award criteria. When using a challenge-based approach to procurement, preliminary market competition is essential to ensure that the market is capable of delivering the desired outcomes. Should the consultation indicate that a great degree of innovation is likely to be required by suppliers to meet cities' needs, following public procurement of innovation (PPI) procedures may be required to support the market in developing a suitable solution.
ix.	*Consider grouping NBS contracts together*	Public procurers may face difficulties in finding suppliers willing to develop innovative NBS solutions when contract values are low. Where possible, grouping several small contracts together in a single call for tender, or where possible allowing suppliers to enter a framework agreement for NBS solutions, may provide suppliers with an incentive to better engage with procurers on such projects. Inter-city collaboration may be valuable here: joint procurement of NBS projects may increase contract value and give suppliers an incentive to participate in a call for tenders.

x.	*Join an NBS network*	Multiple NBS projects are currently ongoing at the EU level. Joining interest groups related to those may help public procurers network with peers and exchange ideas on how best to overcome the procurement challenges that they face. A list of ongoing projects, initiatives and networks supporting NBS projects is updated regularly on the Think Nature Platform.
xi.	*Use pilot projects to build trust in the community*	Many urban communities suffer from lack of trust in public authorities' commitment to deliver infrastructure improvement projects, leading to consultation fatigue and a lack of engagement. In order to gain trust and increase the community's willingness to engage in NBS project, it can be valuable to focus on delivering quick wins that demonstrate the city's commitment to act. Procuring pilot projects can be a good tool to liaise with the community and show that their feedback is valued and acted upon before moving on to large scale co-designed processes.
xii.	*Encourage suppliers to think creatively about community engagement*	In times of Covid 19 and physical distancing requirements, many of the tools usually available to promote community engagement in NBS project are no longer available. Throughout the procurement process, procurers can set clear demands for bidders to propose creative approaches to community engagement, combining digital approaches with live activities to maintain community links to NBS projects throughout the pandemics.

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Nature-Based Solutions (NBS) can be a powerful tool for cities dealing with the contemporary sustainability challenges including degradation of natural capital and ecosystem services, vulnerability to climate change and natural disasters, as well as corresponding health and wellbeing issues. NBS have potential to boost local economies and create business opportunities. However, many public authorities still report difficulties in using public procurement to implement NBS projects. This report provides an overview of the major challenges facing NBS procurers in the EU, along with case studies of success in addressing those barriers across nine European cities. The findings may help other public authorities adapt their procurement processes to procure NBS more effectively.

Studies and reports

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