



NBS Business Model – River restoration

1. RIVER RESTORATION BUSINESS MODEL

According to the European Centre for River Restoration (ECRR), river restoration refers to a large variety of ecological, physical, spatial and management measures and practices. These are aimed at restoring the natural state and functioning of the river system in support of biodiversity, recreation, flood management and landscape development (ECRR, 2014).

By restoring natural conditions, river restoration improves the resilience of the river systems and provides the framework for the sustainable multifunctional use of estuaries, rivers and streams. After restoration the rivers are characterised by dynamic water courses and sediment movements. Some of the mentioned functions are storm water regulation and flood risk reduction, habitat provision, and the provision of public space for recreation. The measures of restoration are diverse and modify different parts of the river e.g., the riverbed, the riverbank or floodplains and include small-scale as well as larger scale interventions.

River restoration involves a wide range of stakeholders from the public and private sector including policy makers, practitioners, scientists and non-government organisations, as well as all citizens groups potentially impacted. By actively drawing these various stakeholders into the process, visions can be shared and tuned towards each other. This makes for different interests to be met and increases support for restoration efforts.

The following *Table 1.1* resumes main features, value proposition, conditions for implementation, main stakeholders involved, costs, financing options and limits of river restoration, considering the desk research, the analysis of the NBS implemented in Front-runner Cities and information provided in the *D5.1 NSB Technical Handbook*.

Table 1.1: Features, value proposition, conditions for implementation, stakeholders, costs, financing options and limits of river restoration

Features
<ul style="list-style-type: none"> • Opening of covered/buried watercourses (rivers, drainage systems) by removing concrete layers • Daylighting leads to more space for the water; increased storage capacity of the channel • Storm water benefits/management; environmental, aesthetic co-benefits • Architectural restoration describes the daylighting of the channel that still follows a concrete/constructed channel (less near-natural than channels of the first type) • Expansion of the flood plain area • Providing additional flood space by excavating the lateral river bed (flood plain area) • Newly created space can be used for e.g. Public purposes (relaxing, leisure activities) or agricultural purposes (farmland) during low water levels
Value proposition/Benefits
<ul style="list-style-type: none"> • Flood risk reduction • Flood protection • Amenity value/recreation • Habitat quality reducing heat stress • Storm water management and storage • Benefits for aquatic organism • Ecological benefits • Improving physical habitat conditions of the watercourse, habitat niches • Aesthetic value and human recreation • Optimisation of water storage capacity • Biodiversity enhancement • Water quality

Conditions for Implementation	
<ul style="list-style-type: none"> • Restriction/limited possibilities in highly dense and build-up areas because of the high cost for shifting of infrastructure/removing of infrastructure • Certain channel width • Need to assimilate knowledge about soil types under/surrounding the channel to guarantee the performance of the daylighting measure • Infrastructure near the river or other types of land use can be seen as a limitation for river restoration, if there is a need for preservation (limited space) 	
Limitations/Barriers	
<ul style="list-style-type: none"> • The establishment of flora and fauna is limited • Restriction of the establishment of animals and plants and therefore a limitation of the provision of ecosystems for wildlife 	
Stakeholders/Beneficiaries	Costs
<ul style="list-style-type: none"> • Inhabitants having interest in the water and natural resources management • City water management (Water Board) • A municipality can finance the renovation of the area • Local businesses (e.g., shops, restaurants, café real estate agencies, professional associations etc.) may increase their earnings attracting more people in the area • Offices: employees may benefit from the reduction of heat stress in the area as well as access to the watercourse • City users (e.g., employees and students): people that do not necessarily live in the city but come regularly to the city for work or to use other services or amenities could benefit of the requalification of the area • Policy makers, practitioners, scientists and non-government organisations can establish an alliance to cooperate with the project 	<p>Costs are mainly paid by private as well as public entities. In particular, the municipality and the water board department are engaged in the reconstruction of the watercourse, while developers usually pay for the construction of the park (if established). The costs may vary considerably.</p> <p>In a previous EU- funded project in Lotz, implementation costs were approximately 700000 Euros.</p> <p>The project in Munich costs approximately 35 million euros: 28 million euros in construction costs, 7 million euros for the remediation of contaminated sites.</p>
Financing options	
<ul style="list-style-type: none"> • Innovative municipal financing approaches <ul style="list-style-type: none"> ○ Municipal investment: municipality takes the lead in NBS financing by earmarking a share of public budget for the NBS implementation and maintenance.) ○ Accessing external funding sources: for example, regional, national and EU and/or other funds can be an important source of NBS financing ○ Cross-departmental budget: NBS financing could be enhanced by promoting the communication, cooperation and cost sharing across the budgets of different municipal departments or cross-departmental budgets for the multidisciplinary interventions • Public-Private partnerships <ul style="list-style-type: none"> ○ Mobilising investment from municipal enterprises/utilities: Municipalities and municipal companies might want to co-invest in interventions that support achieving their strategic and political goals. • Mandatory Requirements and Tax Initiatives 	

- Land value & value-capture taxation: for example, the Zoning Plan of investments in Eindhoven includes the obligation to contribute to reconstructing the Gender for the owner of the land/building, which lives near the Gender. In exchange, the land/building owners are allowed to build more building units

2. CASE STUDY: BUSINESS MODEL OF RIVER RESTORATION

1.1 Eindhoven experience - Re-Establishment of Watercourses (Daylighting) in Victoriapark

Almost 20 years ago, Eindhoven started the reconstruction of watercourses in order to make the water system visible, by removing concrete layers. This strategy allows creating a more robust and as natural as possible water system removing concrete layers. In particular, the re-establishment of watercourses (daylighting) is planned in “Victoriapark” (one of the several NBS locations). One of the goals of the project is to uncover sections of covered watercourses with the aim to re-establish water courses and manage water flows.

In the following *Figure*, photos showing the current design of Victoriapark area is reported.



Figure 2.1: Victoriapark – Current design¹

1.1.1 Value proposition

The city of Eindhoven is facing critical issues from the environmental point of view, including floods, urban heat stress, air pollution, lower quality of life and the disappearance of streams and ditches.

A way to solve most of these problems consists of the re-establishment of watercourses, creating at the same time new water systems **to optimise the use of water storage capacity** as well as **to create extra capacity in the sewage system** of Eindhoven. The re-establishment of watercourses contributes to enhance **biodiversity**, to **reduce heat stress** and to **improve the general quality of life**.

Among the benefits coming from the implementation of the selected NBS there are **storm water management, flood risk reduction, amenity value/recreation, habitat quality, benefits for the aquatic organism** (light plays an important role for population movement) and **aesthetic value** for the human recreation.

1.1.2 Key Beneficiaries and Stakeholders

The main groups of beneficiaries are very similar to those reported for the previous NBS located in Clausplein, since the proximities of the two areas. In summary, they are:

¹ Figures are property of the Municipality of Eindhoven and can be publicly disseminated.

- Inhabitants of buildings around the park benefiting from the re-establishment of watercourses improving the quality of life thanks to the enhancement of biodiversity and the reduction of heat stress.
- City water management (Water Board)
- Café and Restaurants near the park may increase their earnings: the implementation of the selected NBS may contribute to attracting more people in the area, increasing the opportunities for commercial activities.
- Offices near the park: employees may benefit from the reduction of heat stress in the area as well as access to the watercourse.
- Libraries and Design Academy next to the Park may increase their attractiveness for visitors and students.
- City users (e.g. employees, students etc.): people that do not necessarily live in the city but come regularly to the city for work or to use other services or amenities could benefit of the requalification of the area

1.1.3 Financing models

As all other NBS selected by Eindhoven and described in the present deliverable, the watercourse daylighting project in Victoriapark foresees mainly the use of public funds (e.g. municipality through inhabitant taxes and/or income by selling public spaces, European Community, regions, national government and public owned utility companies etc.).

In particular, in this case, funds can be obtained from the Zoning Plan of Eindhoven² that includes the obligation to contribute to reconstructing the Gender for the owner of the land/building, which lives near the Gender. In exchange, the land/building owners are allowed to build more building units.

Finally, the Water Board agreed on paying part of the investment costs for the reconstruction, which will positively impact on the water sewage system.

1.1.4 Actors involved in the implementation and maintenance of re-establishment of watercourses

The following actors will be involved in NBS implementation and maintenance of the selected NBS:

- Project leader and policy advisor
- Designers, civil engineers, area coordinators
- Real estate investors (i.e., building/landowners)
- Non-government organisations
- Water Board
- Green platform (“Trefpunt Groen Eindhoven”), an NGO that represents green/environmental organisations
- Shop owners in the park
- Citizens

1.1.5 Key activities

Table 2.1 identifies the key activities needed in Eindhoven to deliver the proposition of the project.

² Zoning is the process of dividing land in a municipality into zones (e.g. residential, industrial) in which certain land uses are permitted or prohibited. The Zoning Plan of Eindhoven is public and available upon request.

Table 2.1: Key activities foreseen for the implementation of the re-establishment of watercourses

Key activities	Description of activities
Inform, inspire and involve stakeholders	Dissemination of the purpose, advantages and benefits of the selected NBS
R&D	Selection of the best water systems involving water, retaining and green experts for the water flows management
Implementation	Implement the project with the involvement of designers
Maintenance	The maintenance of the water course will be performed by (paid for by) the Water Board. The park will be sold to the municipality for 1 euro, after which maintenance of the park will be paid for by the municipality.
Agreement	Obtaining investor and designer agreement to proceed into the project

1.1.6 Key resources

The following *Table 2.2* identifies the key resources needed in Eindhoven to fulfil the proposition of the selected NBS.

Table 2.2: Key resources for re-establishment of watercourses

Key resources	Needed to/for...
Project leader, designers, civil engineer, maintenance and water experts	Procurement team planning specific knowledge and driving change and creativity
Construction/maintenance contractors	Implement and maintain the project
Money and funds (Municipality budget, subsidies/grants regional, national, European)	Design, implement and maintain the NBS
Municipality	Involve, inform, inspire residents/businesses through a communication plan

1.1.7 Cost structure

No information about the costs needed for the re-establishment of watercourses in Victoriapark is available yet. However, according to a first estimation coming from the Municipality of Eindhoven, costs will be paid by private as well as public entities. In particular, the municipality and the Waterboard will pay for the (re)construction of the watercourse, while the developer will pay for the construction of the park.

Figure 2 below summarizes the main sections of the Business Model Canvas developed for the re-establishment of watercourses (daylighting) in Victoriapark (EIN).

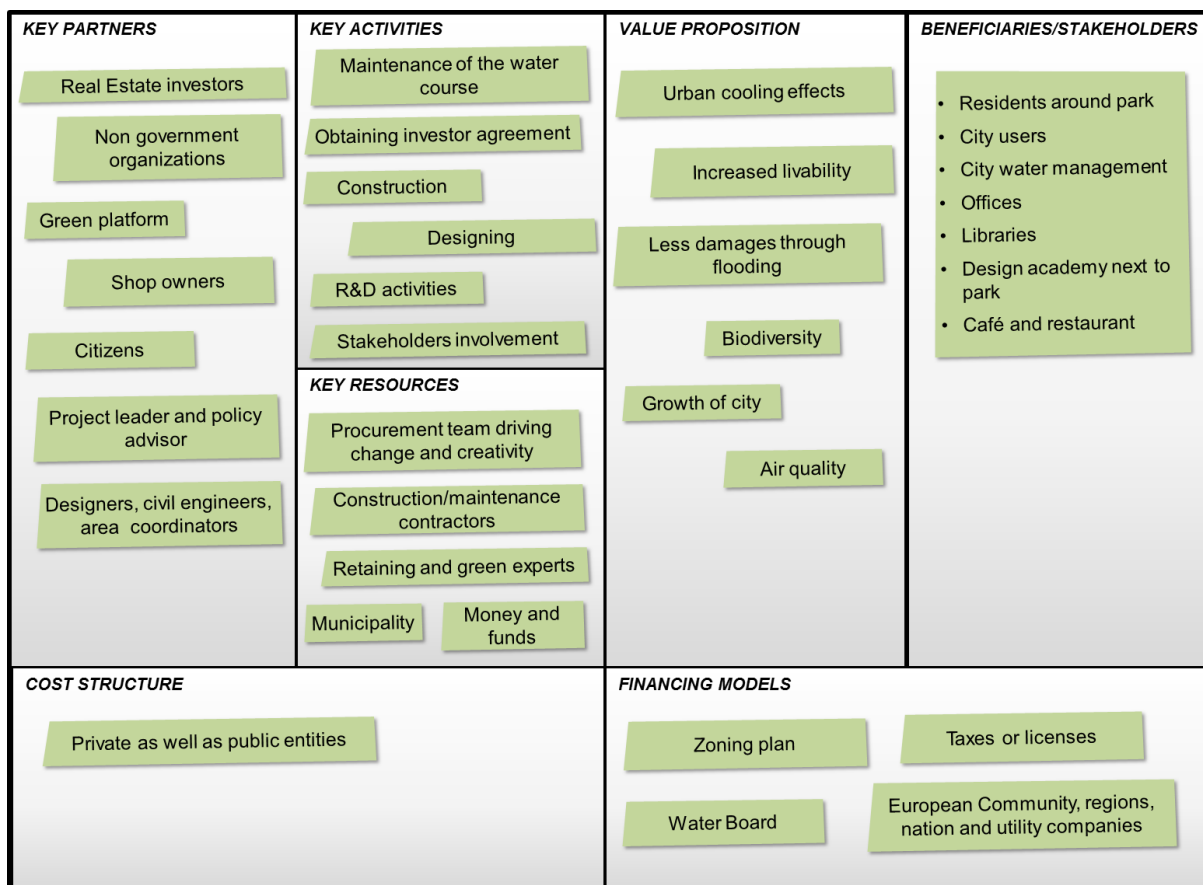


Figure 2: Business Model Canvas – Re-establishment of watercourses (daylighting) in Victoriapark (EIN)