

## // General description and characterization of the NBS type

### I.1 Definition and different variants existing

#### Definition

Due to climate change sea level is rising and thus brings challenges for local governments with coastal access and communities - waterfronts.

Waterfronts are a space, parts or a district of a city with access to water, often grown historically without an overall plan and thus nowadays often revitalised. It is not only about a sea access, it also can be direct access to lakes, rivers or similar larger water elements. Beside sea level rising, extreme weather events are increasing too and thus storm water management is getting a more relevant issue.

The implementation of a green waterfront city provides opportunities to restore and protect coastal ecosystems and to protect coastal communities by same time having a wide range of benefits, especially regarding recreation.

By the same time, these complex urban processes are often challenged by social challenges like gentrification and need in general an overall strategy.



Fig.: Vancouver waterfront (LMN Architects 2018)

#### Different variants existing

Six kinds can be distinguished, depending on the typologies:

##### => New urban expansion

This sub-type is characterized by an overall rebuild of available areas, typically old industrial or port areas.

##### => Waterfront and great events

Development based on a greater event, like an Olympia or an Expo – re-use of areas.

##### => Port settlement

Settlements around port with harbour.

##### => Reuse of Port areas

Former port areas are re-used.

##### => Flood defence

Structural interventions for flood defence.

##### => Urban beaches

Environment around artificial beach installations.

<b>I.2 Urban challenges and sub-challenges related + impacts</b>		
<b>Main challenges and sub-challenges targeted by the NBS</b>	01  Climate issues > 01-1 Climate mitigation > 01-2 Climate adaptation 02  Water management and quality > 02-2 Flood management 04  Biodiversity and urban space > 04-1 Biodiversity > 04-2 Urban space development and regeneration > 04-3 Urban space management 05  Soil management > 05-1 Soil management and quality 07  Public Health and wellbeing > 07-2 Quality of Life 09  Urban planning and governance > 09-1 Urban planning and forms	<ul style="list-style-type: none"> <li>- Carbon sequestration in the green area</li> <li>- Temperature reduction due to a better diffusion of sea breeze</li> <li>- Buffer role in case of rise of the water level</li> <li>- Increasing and preserving biodiversity (habitat) and improve the connectivity between blue, green areas</li> <li>- Increasing green areas</li> <li>- Avoid erosion</li> <li>- Aesthetic value, contact with nature</li> <li>- Limiting built area, increasing green space</li> </ul>
<b>Co-benefits and challenges foreseen</b>	02  Water management and quality > 02-1 Urban water management 08  Justice and social cohesion > 08-2 Social cohesion	<ul style="list-style-type: none"> <li>- Reduce water run-off</li> <li>- Support for education</li> </ul>
<b>Possible negative effects</b>	07  Public Health and well-being 08  Environmental justice and social cohesion > 08-2 Social cohesion 10  People security	<ul style="list-style-type: none"> <li>- Promotion of allergies</li> <li>- Gentrification</li> <li>- Risks due to water access</li> </ul>

### **III/ More detailed information on the NBS type**

<b>II.1 Description and implication at different spatial scales</b>	
<b>Scale at which the NBS is implemented</b>	Typically district or city scale – because of overall concept
<b>Impacted scales</b>	The impacted scales are wide-ranging from district to whole city.
<b>II.2 Temporal perspective (including management issues)</b>	
<b>Expected time for the NBS to become fully effective after its implementation</b>	Depending on scope of actions and area size  2-20 years
<b>Life time</b>	Depending on action – in general basically renaturation actions and thus self-sustaining.
<b>Sustainability and life cycle</b>	Property prices are often increasing dramatically by waterfronts since post-industrialism.
<b>Management aspects (kind of interventions + intensity)</b>	- Overall master management strategy
<b>II.3 Stakeholders involved/ social aspects</b>	
<b>Stakeholders involved in the decision process</b>	<ul style="list-style-type: none"> <li>- Owners, co-owners (in case of a joint ownership property)</li> <li>- municipality departments (nature protection, water, ...)</li> </ul>
<b>Technical stakeholders &amp; networks</b>	<ul style="list-style-type: none"> <li>- Landscape architects/Urban planner/cultural technique expert</li> <li>- Specialized green spaces management firms, horticulturist and gardeners.</li> <li>- The technical stakeholders network for this kind of NBS is not very well identified.</li> </ul>
<b>Social aspects</b>	<ul style="list-style-type: none"> <li>- Necessity to find an agreement with neighbour and citizens</li> <li>- Gentrification</li> </ul>

## II.4 Design / techniques/ strategy

<b>Knowledge and how-know involved</b>	- Selection of NBS and plants adapted to: <ul style="list-style-type: none"> <li>• the local climate</li> <li>• challenges targeted</li> </ul>
<b>Materials involved</b>	- plants - substrate/soil - drainage - sand

## II.5 Legal aspects related

National laws  
Regional laws/guidelines

## II.6 Funding Economical aspects

<b>Range of cost</b>	nA
<b>Origin of the funds (public, private, public-private, other)</b>	nA

## II.7 Possible combinations with other kinds of solutions (other environmental friendly solutions or conventional ones)

Nearly every NBS type or action.

## III/ Key elements and comparison with alternative solutions

### III.1 Success and limiting factors

<b>Success factors</b>	- Overall strategy plan - Adequate water management - The right plant choice
<b>Limiting factors</b>	- Maintenance - Vandalism

### III.2 Comparison with alternative solutions

<b>Grey or conventional solutions counterpart</b>	<ul style="list-style-type: none"> <li>• Grey waterfront</li> </ul> <p>No living solution with the basic main function but with less diversity of multiple benefits.</p>
<b>Close NBS</b>	<ul style="list-style-type: none"> <li>• Related to all NBS Types out of the Water category.</li> </ul> <p>The green waterfront city is a combination of several NBS action performing together.</p>

## IV/ References

### IV.1 Scientific and more operational references (presented jointly)

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