

Sustainable regeneration of brownfield sites

Step-by-step guide for local authorities

RAMBOLL

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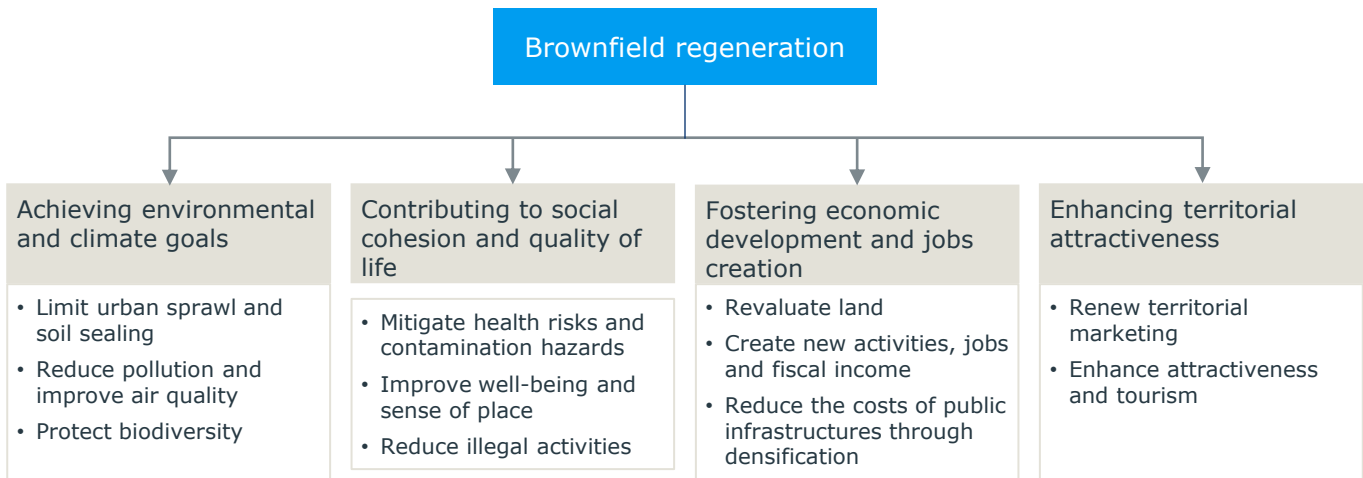
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Brownfield activation as a tool to achieve urban sustainable development

A raising practice, leading to multiple territorial assets

At the European level, there is a raising interest in brownfield regeneration as driver of sustainable urbanisation. Sustainable use of land has been acknowledged as a crucial condition contributing to the achievement of a climate-neutral EU by 2050, as drew up by the European Commission in compliance with the Paris Agreement. In this regard, the regeneration of unused, underused, or abandoned areas and buildings can limit investments in greenfield and prevent urban sprawl. Through a balanced densification, oriented towards brownfield re-use, negative environmental, social, and economic effects such as soil sealing, loss of agricultural land, higher costs of infrastructure and transport-related emissions can be mitigated. Moreover, brownfield valorisation can remediate contamination, bring new investments, and strengthen the local identity and attractiveness through the re-discovery of the historic heritage (e.g., factories, former public infrastructures).

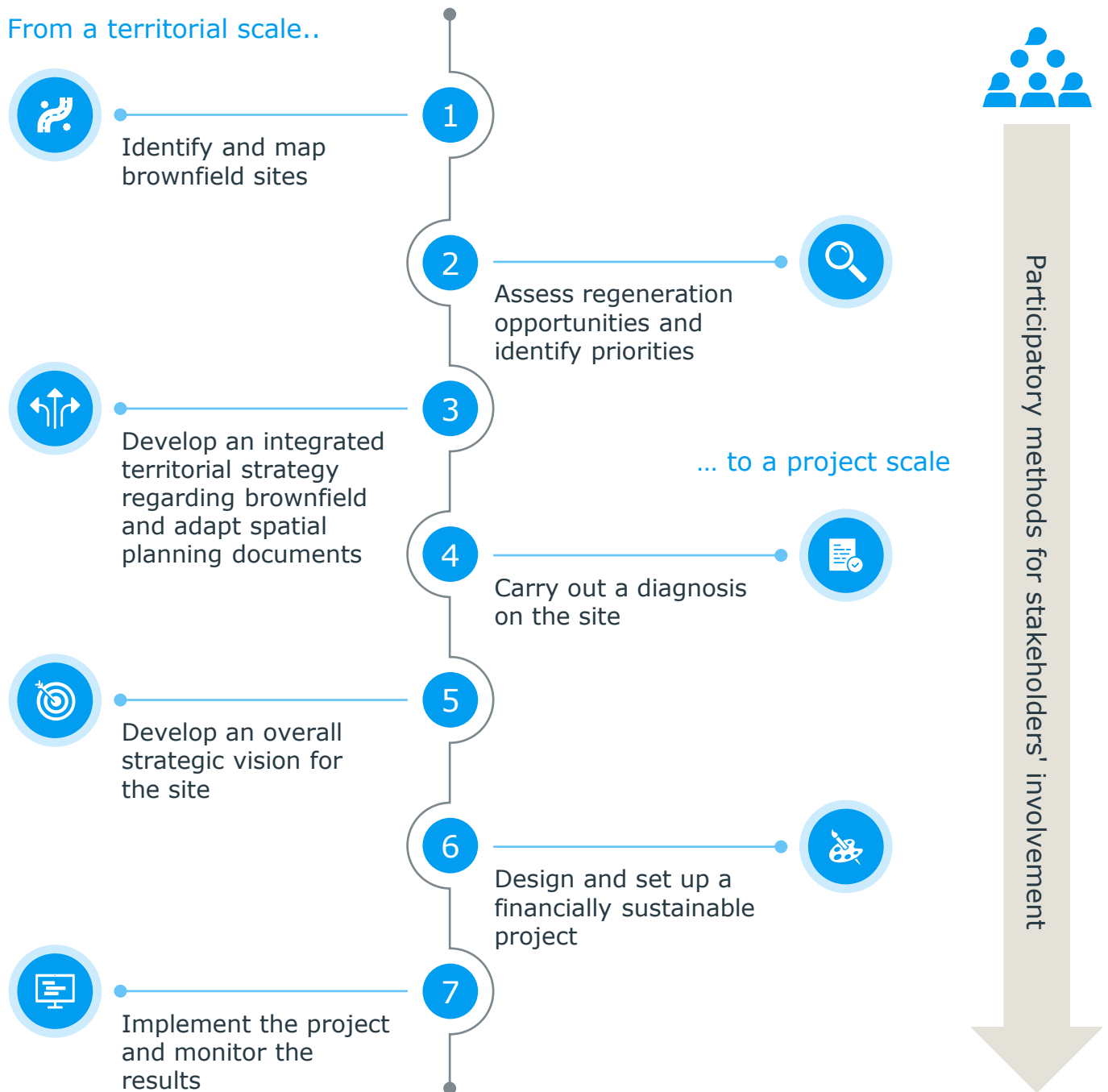


A document to guide local governments throughout the regeneration process

Against the backdrop of a raising awareness on the topic, local authorities acknowledge the importance of brownfield activation but often lack a clear overview on the different actions to be undertaken. This step-by-step guide aims at informing local authorities and provides guidance in developing new brownfield activation practices, considering aspects such as knowledge creation, design methods, funding opportunities and financial arrangements. This guide has been supervised by the [ESPON Programme](#), which already supported research and knowledge building on the topic, notably through the SUPER (Sustainable Urbanization and land-use Practices in European Regions) and ENSURE (European Sustainable Urbanisation through port city Regeneration) projects. The [Slovak Ministry of Transport and Construction](#) has acknowledged the prominence of land reuse. The new Operational Programme for the programming period 2021-2027 is expected to highlight the importance of brownfield transformation (notably former industrial sites) through sustainable innovative interventions.

A 6-step guidance for cities, towns and villages

From a territorial scale..



Before engaging in any brownfield regeneration project, local authorities need to adopt a place-based and comprehensive approach regarding land use and territorial development potential. In this regard, it is crucial that solid knowledge on existing underused, unused and abandoned areas and buildings is available at the territorial scale, and that a coherent vision on development priorities at the city level is strengthened.

Why mapping brownfields?

Consider setting up a new organisational unit within the municipality, that can run not only the mapping, but the whole activation process.

Brownfields are areas and buildings that have all the following features:

- Source: CABERNET, 2005

- Brownfield mapping in Slovakia, by the Slovak Environmental Agency
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- When mapped, each area and building identified as a brownfield should be classified according to several criteria (localization, size, original and current use, ownership, level of contamination, historical value, relationship to the territorial plan...) A georeferenced map at the scale of the municipality, as well as a "passport" for each brownfield are created.

Source: Metropolitan Institute of Bratislava, 2019



2 Assess regeneration opportunities and identify priorities

Once the overview of brownfields at the territorial level is established, a [first global assessment](#) can be realised crossing two criteria (expected level of pollution and localisation). This analysis will help in targeting potential sites and identifying whether public investments are necessary.

Archetypal situations	Level of pollution and associated costs	Localization	Economic feasibility and public intervention added-value
A. Strategic sites / High economic feasibility	+++	+++	Large and very strategic brownfields as regards to the location (metropolitan hubs, very dense areas connected to public transportation, high land value). Despite high pollution level, brownfields will likely attract private investments, expected profits being higher than the environmental remediation costs (positive ratio after cost/benefit analysis). Public authorities shall consider models allowing to keep property and public control.
B. Sites with potential regarding urban regeneration / Medium economic value	++	++	Smaller brownfields located in built-up areas, close to surrounding services. Private investors might be interested depending on the cost of depollution. Public support might be necessary to define a sustainable economic model. Estimated territorial benefits justify the costs, shared between public and private stakeholders.
C. Sites with major constraints / Low profitability.	++	+	These sites are not attractive to private investments nor a priority in terms of densification strategies. However, special innovative development processes are needed to comply with environmental legislation and to prevent risks. When dealing with highly polluted sites, public authorities can encourage alternatives uses such as photovoltaic farms.

As a result, [brownfields from the A category](#) are potential drivers for sustainable urbanisation. However, they do not necessarily require public investments, as they are highly attractive to private investors. In this case, the local authority should:

- Pave the way for regeneration by adapting spatial planning documents (if needed)
- Promote the site to private stakeholders and real estate market, although the local authority can still decide to lead the regeneration project (for instance if the expected revenues are high). Consider keeping or acquiring property, only selling only building rights, and defining conditions for further developments that will integrate public interest (prevention of gentrification for instance)
- In case of high expected pollution estimated, help reducing uncertainty regarding the cost of depollution by providing data and diagnostics.

[Brownfields from the B category](#) have potential for achieve sustainable urbanisation but are not among private developers 'priorities. In this case, the local authority should:

- Target strategic brownfields within planning documents and be ready to adapt local masterplans for future regeneration projects led by public or private stakeholders.
- Design a project adapted to local context and needs, and economically sustainable. Public-private partnerships might be the best arrangements to activate such brownfields.

When dealing with [brownfields from the C category](#), local authorities shall make sure that safety requirements are met.

- Consider potential interest of the site for industrial functions/ infrastructures with special requirements (e.g., polluting activities), their activity not being conciliable with residential areas. Find alternatives to create new low-cost uses and services that can even generate revenue (renewables energies)

A second level of assessment shall be conducted as regards **feasibility** and **sustainability** of further regeneration, allowing to prioritize the brownfields considering their impact on sustainable urban development.

On which brownfield(s) should public investments be targeted?

Sustainable urban development criteria



Is the brownfield located in a built-up area? Will its regeneration contribute to urban densification, and to prevention of urban sprawl?



Is the brownfield already integrated in the urban networks and flows?

Could it lead to increased multifunctionality in the area and improve living conditions of the inhabitants, including marginalized social groups ?

Feasibility criteria



What is the estimated cost of depollution and how can it be born in a global economic model? Which are the expected gains and benefits?

Who is the owner? Might fragmented ownership lead to administrative burden?



Is a change in the masterplan necessary to carry out a regeneration project?

At the end of this step, you will have an inventory of brownfields, classified according to their economic potential (A,B,C) and according to feasibility and urban development criteria



The Lene Voigt Park in Leipzig, a former railway junction, was created between 2001 and 2004.
©Luftaufnahmen von Deutschland

3 Develop an integrated strategy regarding brownfield regeneration and adapt spatial planning documents

1 Make sure that the activation project complies with both the [local](#) and [national spatial planning policies](#) and [documents](#). If not, consider starting a long-term formal administrative procedure to [change and adapt the masterplan](#). In any case, it is important that the issue of brownfield regeneration is tackled in spatial planning documents.



2 In the masterplan, design a long-term and integrated strategy at the town-level. Beware that single regeneration projects shall not be isolated. Design [connections and nature-based solutions](#) (e.g., green corridors, greenbelts, buffer strips) and integrated mobility plans.



At the end of this step, you will have a local masterplan that better accommodates the presence of brownfields and the need for new public or private intervention, carefully considering crucial spatial planning strategies (above all mobility). The masterplan will include a multiphase regeneration strategy (on 5, 10 and 20 years).



Young city regeneration projects. Gdansk, Poland
© Henning Larsen

At the scale of a project: design and implement integrated projects, in line with local context and needs

After an in-depth reflection on wider local development strategies and priorities, and identification of target brownfield(s), it is time to design and implement an integrated regeneration project, that meets local needs and expectations.

4 Carry out a diagnosis on the site



Investigate the site, its constraints and opportunities

- Documentary analysis, investigation of former and current uses, characteristics and history
- Ownership status and acquisition conditions
- Identification of architectural or historical buildings that should be preserved
- Identification of the site potentialities regarding optimisation of constructability / and possible transformation of existing buildings
- Preliminary studies and environmental diagnostics on contamination levels

Analyse the specific characteristics of the area

- Existing territorial strategies and priorities
- Stakeholders mapping
- Urban functions and real-estate markets trends

Integrate at the earlier stages future users and inhabitants

- See how to enhance stakeholders' participation at the different steps on page 13

At the end of this step, you will have drafted an in-depth analysis of the specific brownfield and the surrounding area (notably real-estate market analysis)

5 Develop and share an overall strategic vision for the site



Draft a first exploratory vision for the regeneration project and its new vocation(s)

- Assess political expectations and identify stakeholders to involve at this strategic step. If supported politically, we advise to combine a top-down and a bottom-up approach, integrating needs assessment and inhabitants' contribution from this early stage.
- Consider all thematic axis (housing, community space, cultural infrastructure, economic development, green area, mobility) and the assets of multifunctionality, not forgetting to consider the site's identity and history;
- Define the key objectives of the project, and draft one or more scenario to be discussed and shared widely
- Consider allowing temporary occupations, in case the permanent project is not immediately implemented
- Ensure the strategic alignment between the scenario and the existing planning documentation
- Based on stakeholder's consultation, choose a scenario to be developed and elaborate a proposition for an overall strategic vision for the area

At the end of this step, you will have an overall vision of the regeneration project, supported by local decision makers and involved stakeholders.

6 Design and set up a financially sustainable project

1 Define a business model



Define a business model considering not only the costs but also the expected benefits

Three types of financing are generally possible: private financing, public financing, or public-private partnerships.

Costs/expenses includes:

- Land acquisition costs (especially if the regen project requires land assembly prior to its implementation)
- Land remediation costs
- Development and construction costs (e.g. base infrastructures, roads, utilities etc.)
- Financial costs (costs of funding)
- Any other additional costs (e.g., marketing) and project management & professional services costs
- Development profit

NB: regeneration projects are usually undertaken over a number of years. It is important to adjust for inflation and other factors such as cost of materials if applicable.

Expenses	Revenues
Land acquisition	Land charge / m ²
Land depollution	
Development costs	
Financial participations	Financial support
Profit	

Above: estimating expenses and revenues of brownfield regeneration

Carry out a detailed cost – benefits analysis

- Identify and quantify project costs (it is usual to start with high level estimates such as +/- 15% and refine assumptions and cost estimates as the project design progresses)
- Benefits must include financial benefits (e.g., development value) as well as direct, indirect and induced benefits. This may include job creation during construction and post construction, apprentices, direct impacts into the local economy, new amenities for inhabitants, impact on the value of real estate in the area...
- The costed option appraisal is a common method of determining optimum uses and development options for vacant buildings. This means estimating the value of a property after restoration and subtracting the cost of works to identify the most cost-effective option and facilitate consecutive decision-making. When dealing with iconic and historic buildings, this often means identifying the smallest financial deficit.

Identify and prospect funding opportunities

- From local, national and European partners and funding mechanisms
- Assess the likelihood of securing such public funding

Carry out an option appraisal of the different business models

- This may include direct public funding (e.g., the public entity funds the project and considers recycling of revenue income to fund future project phases for instance), private funding (e.g., the public entity only sells land as is and development rights on the basis of a development agreement by which the public entity retains a form of control over the shape, size and characteristics of the development), a public – private partnership model (e.g., Joint Venture/ joint development agreement).
- Each project will require a careful consideration of the different scenario considering the attractiveness of the site according to the real-estate market, its location, funding capacity of the public entity owning the project, the legal and contractual impacts and requirements, etc.

2 Settle the governance structures and develop the project execution plan



- Build a team/structure that can act as active urban developer rather than passive assets managers. Setting up a semi-public company (SPC) might be an option.
- The project execution plan should include a description, the schedule of implementation (including key milestones such as political decisions or planning documentation update requirements), stakeholder and communication management plan, etc.
- This should be also based upon careful consideration on how to engage with the market: e.g., architectural competition to enhance innovation and quality of design, engagement with one or more property developers etc.

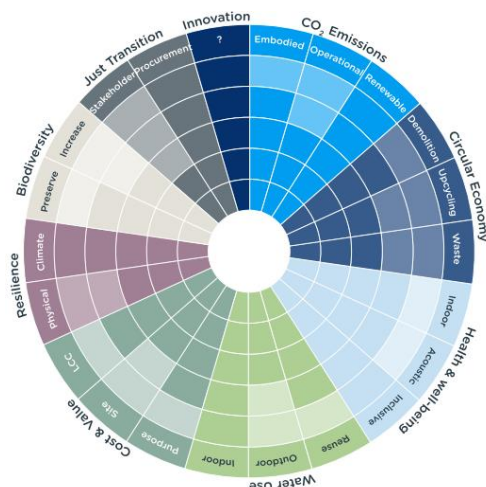
3 Improve the project performance regarding all the dimensions of sustainability



Consider the three dimensions of sustainable development to improve the definition of your project: economy and wealth, protection of environment and climate, social inclusion and affordability.

- Be ready to adapt some of the specific actions !
- If the target area is located outside the city centre, is important to design a balanced relationship with central activities. Try to anticipate and avoid any devitalisation effect.
- When possible, avoid soil sealing (e.g., create green spaces in non-built-up areas)
- Avoid gentrification

The project owner may consider using the Sustainability Framework tool (see below) to engage with the different project stakeholders and determine project-specific targets. This work will most likely require additional assessments and evaluations to quantify achievable targets and enable their monitoring throughout the project lifecycle as indicated in step 6.



Example of Ramboll Sustainability Dialogue Tool, used to identify the appropriate targets, risks, opportunities and actions and generate a holistic and tailor-made sustainability strategy for a project.

For each dimension, the project owner should determine the « right target » considering the overall project objectives and balancing the 3 dimensions of sustainability.

At the end of this step, you will have:

- An estimation of the project cost (cost-benefit analysis), as well as an overview of funding options and a sustainable business case
- A sustainability strategy with clear targets
- A detailed execution strategy and roadmap to ensure a robust implementation

7 Implement the project and monitor results

1

If the brownfield is owned by a private, by the State or other actors, the Municipality **acquires** it.



2

Define **external assistance** and draft **the terms of references for a public competition** (if the operation is not carried out internally).

In this regard, **mobilise an interdisciplinary teams** : architects, urban planners, sociologists, project managers specialised in polluted sites and soils (if necessary); if possible, involve communication and branding specialists from the beginning.



3

Environmental studies are carried out and, in case of positive response, an official **authorisation** is released.

Architectural pre-studies are carried out. In case of pollution a managing plan for depollution is elaborated.



4

Launch a **competition** and select an **external contractor** through a transparent process. The external company will carry out works according to the terms of reference, under the supervision of the local authority



5

Communicate on the advancement of works through campaigns and events. The role of public investors (Municipality, Region, State, European Union) shall be stressed.



At the end of this step, you will have:

- A formal authorisation to proceed with architectural works and environmental remediation
- A selected contractor that will carry out the regeneration works, according to the terms of reference

Stakeholders' participation, A key factor for a successful regeneration project

Participatory methods directly engage residents and stakeholders in the process of spatial planning. A bottom-up approach facilitates the identification of local needs and the design of collective solutions. These methods shall occur at every phase of the project: the sooner, the better!

Encourage citizens, associations and researchers in collecting information on brownfields and creating « passports »

Enable participatory initiatives such as focus groups, visits and workshops. Ensure that a wide diversity of stakeholders (in terms of gender, age, income) is represented. Make sure that these meetings contribute to the co-construction of the regeneration project, and not only to informing stakeholders

Launch a call for ideas and invite students, architects and other stakeholders to suggest potential actions, interventions, uses and functions

Anticipate potential conflicts and integrate different expectations and experiences (e.g., role playing activities, surveys, questionnaires)

At a later stage, design an effective story telling and communication campaign on the project.



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