Initiation Phase

Initiation phase

Building with Nature Design may be introduced in a project development process as early as the Initiation Phase. The Initiation Phase deals with a first definition of the problem or opportunity at hand and the scoping of potential solutions.

Building with Nature approach: wider and greener scope	Traditional approach: sectoral, narrow scope
System Approach: the BwN approach takes a wider perspective and aims for multiple objectives, i.e. strives for benefits to other functions, such as nature, recreation and other ecosystem-dependent functions. Applying BwN-principles as early as the Initiation Phase will have the largest influence on the end result.	Project Approach: traditionally, the initiation phase is characterized by a sectoral approach, a limited and mono-functional problem perception and a tendency to jump to solutions. Tradition plays an important role. Already in this early stage of development a usually narrow project framework is defined. This can be due to the problem-owner's/project-initiator's objectives or limitations, or to authorities biased to certain classes of problems and solutions.

Introduction

In the Initiation Phase the eco-dynamic developer has the largest freedom of choice regarding definition and realisation of project objectives. Including the BwN-perspective in this phase should guarantee scoping beyond sectoral interests and limited problem perceptions, focusing on opportunities and win-win solutions.

Broadening the scope (wider, greener, more multifunctional, better integrated, more sustainable) opens new perspectives. As far as possible under the constraints applicable, this can be achieved by:

- identifying potential positive effects of the project, not only negative impacts and problem solving,
- integrating nature and natural processes as means to achieve the project objectives and to enable additional functionality, and
- embracing other functions (and associated stakeholders) as "running mates", rather than isolating them as liabilities.

Especially in the Initiation Phase the shift in thinking as described in the BwN principles is of utmost importance. BwN solutions involve a transformation from a problem to an opportunity, e.g:

- Enriching revetments: a dike is not just an artificial structure that provides safety from flooding, but also provides habitat and shelter to flora and fauna and connects ecotopes along the dike;
- Harbouring Opportunities: a harbour is not only infrastructure, but also an ecological hub connecting different water bodies, thus providing migration opportunities for many species.

This section provides guidance on the steps towards BwN objectives definition and project scoping. Where appropriate, useful methods and tools are suggested.

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Process

As indicated in the Introduction section of this guideline, the development of BwN solutions in each project phase follows the standard Five steps.

- **Understand the system:** describe and understand the functioning of the biotic, abiotic and socio-economic environment in which the new infrastructure is to be realized and identify the functional links with the project aims. A thorough understanding of the system and the role the envisaged infrastructure can play in it is vital to the design process.
- **Identify realistic alternatives that release the BwN potential:** formulate wider sustainable perspectives, widen the project scope by introducing a different way of thinking and develop alternatives within this wider scope utilizing and/or providing ecosystem services.
- **Valuate and select alternatives:** critically assess potential alternatives, selecting what is viable, acceptable and promising in the next phases.
- **Elaborate selected alternatives:** elaborate strong elements of the alternatives and consider combination with strong elements of others, so as to achieve the best possible options; consider project execution aspects in the process and be clear about the arguments that underlie the selections made.
- **Transfer BwN options to the next phase:** although development and design processes are always to a certain extent cyclic, it is essential that to secure the transfer of the BwN-ideas to the next phase; taking this into consideration ensures the BwN approach to remain within sight throughout the project realisation process.

Crucial ingredient in this five step process is the timely involvement of the relevant experts, stakeholders and decision makers.*

Besides experts with relevant knowledge, 'champions' should be involved that can generate momentum for the BwN idea. Further, ecologists as well as environmental economists should be involved in this process as early as possible to enhance utilization and/or provision of ecosystem services.

Releasing the BwN-potential during the Initiation Phase is mainly done in creative working sessions. The outcome of such working sessions depends very much on the careful selection of the participants. A lesson learned during the BwN-programme is that a network, a healthy mix of people who adhere to traditional solutions and people who like thinking out of the box, produces results that are innovative yet feasible.

Step 1) Understand the system

The first Building with Nature principle states that man-made projects are an inherent part of the environment, providing a unique opportunity to induce positive change. Therefore, a thorough understanding of the system in which a project is planned is crucial to maximize benefits.

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The generic strategic BwN objective is to deliver engineering services while delivering and/or utilizing ecosystem services. Once the project objectives are clear, the first step is to identify and investigate the biotic and abiotic ecosystem and the socio-economic system at hand.

A thorough understanding of the ecosystem, with a focus on the ecosystem services, is required to capture the opportunities that man-made projects provide. In the initial stage of a project, knowledge and understanding of the ecosystem at hand may be limited, if it were only by lack of data. The use of generic process knowledge and analogies with other locations may help, although they cannot account for the 'genius of the place'.

In order to generate the appropriate understanding of the ecosystem, a system analysis needs to be performed (see Tools: System Analysis). Basically the following activities are required for the development of a BwN design:

- Determine the boundaries of the natural and socio-economic systems
- Determine the location specific characteristics
- Determine the dynamics of the natural system
- Identify relevant ecosystem services
- Specify the stakeholder context

Determine the boundaries of the natural and socio-economic systems

Most ecosystems are open, the state of their elements is determined or strongly influenced by the interaction with neighbouring or distant elements. Interactions (e.g. exchange of water, sediment, nutrients, or biota) can be upstream, downstream or lateral. On top of this, internal processes may generate or dissipate system components (e.g. biomass, organic matter, or contaminants). Certain functional links, especially those involving economic activities, may reach beyond the ecosystem at hand. It is of crucial importance to choose the system boundaries such, that all relevant aspects can be included in the system analysis. Interesting perspectives may be obtained by considering:

- **Larger scales:** "how does a project interact with its overall environment?"
- **Smaller scales:** "how can a project be made beneficial to local flora and fauna?"
- **Far field links:** "how does the project interact with systems beyond its directs neighbours (e.g. watersheds, pathways of matter, migratory species)?

The related socio-economic system may be contained within the natural system boundaries, but this is not necessarily so. There are functional links, for instance via ecosystem services. Some links are obvious and immediate (e.g. fish abundance and fisheries), others are more distal in space and time (e.g. a disturbed sediment balance in a river yielding coastal erosion).

One has to keep in mind that it is neither possible, nor necessary to include the whole world in the system analysis. At the same time, one should realize that discussion on what should and should not be part of the analysis is a root cause for conflict with stakeholders.

Determine the location specific characteristics

In order to enable custom-fit designs, mapping the location-specific characteristics is an important step. Without this information, one cannot make the step from a general to a site-specific design. Here, too, the characteristics are of physical as well as biological and socio-economic nature. Typical questions in this mapping process are related to prevailing:

- **Hydro- and morphodynamics:** "How does the (local) hydro- and morphodynamic system function (e.g. wave and current climate, transport mechanisms, sediment and nutrient budget, morphological changes) and how will this influence the generic design?"
- **Ecosystems:** "What are the important components of the (local) biotic ecosystem, how do they interact among each other and with the physical environment and how will/can this influence the generic design?"
- **Climate:** "How will the regional climate (e.g. tropical, subtropical, moderate, arctic; humid, arid) influence the design?"
- **Interventions:** "Are man-made interventions (e.g. deforestation, historic coastal structures, levees) in the past still influencing the local system behaviour?"
- **Landscape properties:** "What are the essential characteristics of the landscape and how will they influence the design (in terms of opportunities as well as constraints)?"
- **Governance and legislation:** "How will local governance and legislation (e.g. safety standards, environmental norms, land ownership, budget constraints) influence the design?"

It is important to keep in mind that relevant location-specific information is not necessarily of the location itself. Changes in the watershed many miles away may be relevant, as may be the effects of a certain project elsewhere along the coast.

Determine the dynamics of the natural system

For any BwN design one should consider the different spatial and temporal scales playing a role in the system's dynamic behaviour. Changes at a wide range of time scales may need to be considered, from seconds (water and sediment motion) to decades or even centuries (climate change). One of the basic forcing of the system, the weather, is essentially stochastic with a variety of time scales, so the system's behaviour is likely to also exhibit similar features.

This inherent variability has to be considered in the analysis. Working with time-averaged data only can easily lead to systematic errors. Regular variability (e.g. tidal, seasonal) as well as extreme events (e.g. droughts and floods) should both be taken into account. Furthermore, statistical analyses may be required to distinguish facts from perceptions. (see Tools: Probabilistic effect analysis)

Morphological changes may cover time spans of many years. The Western Wadden Sea, for instance, a tidal embayment with gullies, intertidal flats and salt marshes, is still subject to changes due to the closure of the Zuiderzee more than 75 years ago. Similar long-term developments occur in the Southwesterly Delta of The Netherlands. Here the morphology is still responding to the construction of a system of dams and barriers (the "Delta Works") several decades ago.

Also biological processes occur on different time scales. Recolonisation or recovery timescales may play an important role in the Initiation Phase. For instance: is it ecologically preferable to have a large intervention once, instead of repeated smaller interventions (the Sand Engine concept)?

Identify relevant ecosystem services

Next to responding to the functional requirements of the infrastructure to be developed (possibly described in a System Engineering model), a crucial step in generating the required system understanding is to identify the functional links between the ecosystem and the project. What ecosystem services can the natural system deliver to the project and what can the project contribute to the ecosystem functioning on the other? Mapping these functional links is the basis for exploring potential win-win solutions. To have this clear may help in the relation with stakeholder groups and institutions (see next section). Questions to be answered here are:

- Can the objectives of the project at hand be achieved by using natural resources?
  - to reduce construction and maintenance costs (more flexible solutions, letting nature do the work)?
  - for more sustainable solutions (requiring less energy, less material, or in a multi-functional way)?
- Can a broadening of scope increase the availability of useful natural resources? This can be achieved by embedding the project in other projects or by coupling current project to other developments so that the overall outcome is enhanced.
- Can the system's dynamics be used to contribute to the project (use expected change as an opportunity to achieve objectives, use available time to achieve necessary change gradually and in a natural way, rather than forcing it via engineering)?

Links between the ecosystem and a project always exist. It is important to consider whether they are relevant to the development of the project and how they affect the ecosystem. One should assess whether these links are sufficiently known. If not so, dedicated monitoring and research are needed to build up the necessary knowledge and understanding.

Wherever possible the potential services between the ecosystem on the one hand and the project on the other should be described in terms of flows, carrying capacities and Value Creating Cascades:

- **Carrying capacities:** It is important to know whether or not ecosystem services are already used up to the limit of their capacity. Good understanding of ecological processes, but also of resource consuming economic activities, is needed at this stage. Handling ecosystem services as a basis for design requires close cooperation between ecologists, engineers and (environmental) economists. It is recommendable to use field data and modelling to conduct the analysis of carrying capacities. Also stakeholders can be important sources of information.
- **Value Creating Cascades** is a concept that indicates how related processes may create value in time or in related locations. An example is the nourishment of a specific beach site with a combination of beach shingles and sand for local protection. As a result of this nourishment spit bars and attractive beaches will appear downstream resulting in higher prices for real estate along the coast. The internal rate of return of the nourishment may be too low for a beach protection alone, but the true values are created further down the cascade. VCC is useful for identifying ecosystem services and for cost-benefit analysis.

The BwN Design Guideline provides for tools (Ecomindmap) that help identifying the functional links between the project (intervention), the ecosystem and the socio-economic system.

Specify the stakeholder context

Relevant stakeholders of the project are those people or parties that are using ecosystem services of which the provisioning is changing as a result of the intervention, such as fishermen and citizens, but also regulatory authorities and financial institutions. Project development and acceptance depend strongly upon their involvement and consent. Ambitions and requirements formulated by these groups may act as design criteria. These may relate to effects, costs, location and timing, but also to the allocation of costs, benefits, tasks, responsibilities and risks. The institutional setting determines to a large extent which formal planning procedures apply, which financial mechanisms can be used and how projects can be contracted.

Planning culture and also risk perception are important aspects for the project. Clear examples can be found in the way flood risks are handled in different countries. For example, in the Netherlands we use standards based on a national cost-benefit analysis evaluating flood probability and potential consequences. In the UK all flood protection works are determined on the basis of an individual cost-benefit analysis and only those with sufficient internal rate of return are implemented.

Step 2) Identify realistic Building with Nature alternatives

Once a system analysis has been made, a next question is how to reveal and utilise the potential of BwN alternatives. Below several steps are listed for generation and creative scoping of alternatives. For each step methods are described that focus especially on the use of natural resources and processes in the development of alternatives.

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The following steps are important in revealing and utilising the potential of BwN alternatives:

- Test and widen the project objectives
- Explore beyond traditional approaches
- Enhance the resilience of the ecosystem.

Test and widen the project objectives

Project-initiators are sometimes unaware of the extent to which their project offers potential for BwN. The basis for introducing the BwN approach into a project is critical examination of the project objectives. The following principles illustrate how a project’s perspective can be broadened:

1. **Scope the project eco-friendly, using the concept of ecosystem services:** Explore the possibilities and the potential of "ecologisation" of the scope of a project. For example: don’t see a dike as a means of flood protection only, it can also be seen as a habitat or even as an ecological corridor that provides for other functions. Often the scope comprises of environmental considerations that aim at limiting adverse effects or creating zero impact. It is better to strive for a nature positive impact and to see how this may be achieved. An example is a soft defence with in built aquaculture ponds, that act as a wave attenuation zone. In this way ecosystem services are combined to the overall scope of providing safety. This broadened perspective has the potential to enhance existing ecosystem services and to boost new ones.
2. **Link the project on to other initiatives and objectives:** Widening the scope of the project may offer new perspectives on the opportunities it offers. One may link to nearby projects and optimize on material flows, multiple objectives, combined realisation and more. At the moment, the scoping of alternatives starts from environmental impacts, hence focuses on threats. By extending this to ecosystem services, the focus shifts to opportunities.. An example is the Oesterdam project. Here various objectives are combined into one concept. By providing a wide shallow foreland a dam is strengthened and a system of sand bars and tidal flats is maintained serving ecological objectives. The sand bars and beaches are protected by a system of artificial oysterbeds, which can be exploited and maintained by the local fishery industry. In this way a mono sectoral safety solution becomes a more integral project that serves nature and also the local economy. Another example are

the plans for restoring the ecological functioning of Lake Marker. Here the sand needs for urban development can set free Holocene deposits that are not suitable for construction but can be used for creating shallow foreshores and marshlands which presently are largely lacking. Timing and combining both projects creates opportunities for nature compensation and more cost-effective nature restoration projects.

3. **Test the viability of objectives:** The viability of a project can be tested using different methods, one of which is 'reverse objectives exploration'. In this method contradictory objectives are introduced. If for example the objective of a project is to limit coastal erosion, one may explore a course of action to see how coastal erosion can be increased, e.g. by steering tidal channel towards the coast. The measures identified may help to identify further measures to reduce erosion. Often, ecosystem functions are only recognized if they have disappeared. Another test may relate to timing: as natural processes have their own spatial and temporal scales, BwN solutions generally have a greater potential if time and space permit to include these processes and to make use of them. For example, active dune formation is a process that has a specific building capacity. In most coastal sections of the Dutch coast, favourable conditions may lead to a net growth of 1 meter per year. If strengthening would require widening of the existing dunes with 10 meters with a deadline 5 years from now, it will not be possible to achieve this by natural dune formation only. One may opt for a combination of artificial and natural dunes creation. Another solution is to extend the deadline, so that the whole scheme may be implemented by using natural dune formation only.
4. **Question prerequisites:** Prerequisites, such as budget and time constraints, often narrow the scope of a project and preclude or hamper innovative solutions. Challenging these prerequisites may show some of them to offer scope for redefinition, as they originate from previous projects, traditional thinking or inaccurate assumptions. An illustration is the project Future for the Afsluitdijk, on the dam that closes of the former Zuider Sea and formed Lake IJssel. A design competition was held to provoke integrated concepts for strengthening the Afsluitdijk, development of nature, production of energy, management of the water (level) and more. One prerequisite was that no brackish water was allowed to wash over into Lake IJssel, since this also serves as a drinking water source. This prerequisite determined to a large extent the need for high and expensive dikes, or secondary dikes that would contain brackish overwash in intermediate lagunal systems. However, later on in the project it showed that the overwash during storm conditions was limited and posed no risks. Consequently different and more cost-effective solutions were possible for handling the safety issues in the project.

Explore beyond traditional approaches

Several techniques may be used to explore solutions outside the realm of traditional approaches. By giving up traditional reference frames, one may trigger lateral thinking. Below are three examples/techniques, especially suited for BwN projects:

1. **Limited resources:** an option to provoke new lines of thought is to assume that certain critical resources are no longer available. Here we list three such lines that may lead to BwN-solutions:
   - **Suppose no concrete or rock is available.** This means that hard structures, such as dikes, revetments and groynes are out of the question. Thus one is forced to focus on the potential of soft solutions. In many weak link projects along the Dutch coast soft solutions were explored and eventually even placed in combination with existing dikes, such as along the section of Nieuwvliet Groede, in the province of Zeeland.
   - **Consider a limited availability of sand and energy.** Within the domain of soft or natural solutions there may still be scope for further optimization. Stopping optimization too early may lead to rejection of the BwN-alternative because of its costs. This line of thought gives focus on the cost-effectiveness of soft or natural solutions. Often hard and soft combinations are more cost-effective in the long-run as are systems that are based on by-passing and re-circulating sand instead of the constant nourishment out of distant abstraction sites.
   - **Assume limited funds.** This will help focusing on the economic dimension of ecosystem services. Not only will they be brought more explicitly into the process of design, but also into the valuation of alternatives. Arguing from the perspective of ecosystem services may also help identifying other sources of (co-)funding.
2. **Incremental development, self-building and self-maintenance:** Make use of natural processes, thereby taking into account self-building and self-maintaining capacities of the natural system. Solutions that have to be realized within a short period of time are often more costly and require more maintenance. Availability of time and space brings alternatives within sight that utilize natural processes. Depending on the situation, such incremental alternatives may be more natural, more cost-effective and less confronting to stakeholders and public. On the other hand, incremental projects with an uncertain final outcome often pose problems to decision makers and the public because of the uncertainties involved. They may hamper decision making on investments and economic developments. Balancing the pro's and con's is necessary (see also the governance section). In such cases, adding an adaptive dimension to the project may help.
3. **Projected patterns and ecosystem association:** It may be useful to look for a reference project in terms of ecodynamics and type of intervention. By projecting this onto the location of the project at hand, the embedding in the natural system can be imagined. This so-called Geoshaping or Ecoshaping helps to scale solutions and to foresee patterns, gradients and responses. In scoping the possible effects of the Sand Engine, reference coastal situations were studied in order to assess possible long-term effects or effects that are difficult to model, such as the sedimentation of silt on the beach. One should, however, be aware of the differences between the project situation and the reference situation: the reference project can be a reminder and a source of inspiration, but it is probably not a ready-to-use solution.

Enhance resilience of the BwN design

It is not possible to give a 100% performance guarantee for BwN designs. Our understanding of the natural system's behaviour is limited and influenced by factors beyond our control. Moreover, predictions of morphological and ecological processes may include significant and sometimes inherent uncertainties. Testing a design should therefore include the performance outside the range of normal conditions (e.g. epidemic floral or faunal diseases, the effects of a freak storm). How resilient is a project facing such events? To what extent can it recover or be remediated / restored? Does the need for remediation also generate new lines of thinking and win-win situations? Often redundant materials can be used to also enhance recovery of the natural environment and to create more robust system solutions.

When considering a conceptual design, one has to take into account all sorts of natural dynamics: average conditions, design conditions, extreme events and incidents, gradual shifts and trends. To enable testing and – if necessary - adjusting a design, it needs to be exposed to various "stresses". Depending on the situation, different kinds of "stress tests" may be used:

1. **Test for a range of natural conditions:** normal conditions, extreme events, water level variations and other relevant conditions. Also test for trends such as gradual sea level rise or lake level variations. These tests should comprise all related ecosystem services. For coastal projects it is common to take at least major storm events and sea level rise into account. For projects that focus on inland water systems, both flood events and prolonged droughts may be important.

2. **Test for different socio-economic conditions**, such as a lack of capital for operation and/or maintenance, or extreme changes in economy (especially crises). Alternatives that require expensive maintenance are vulnerable to budget cuts. What are the risks if projects are not properly monitored and maintained? What is the risk of the project triggering perverse (economic) incentives? For example: will it attract uncontrolled touristic development with consequences for protected species?
3. **Test for the possibility to manage variability:** Stochastically driven dynamic system exhibit a range of state variations. The possibility to manage this variability needs to be evaluated. This may lead to adaptive management or contingency plans. Unacceptable risks that cannot be managed should be avoided by a different design, or they should be dealt with otherwise (e.g. by emergency plans, or insurance).

These tests may result in an optimization of the project that goes beyond object design. Administrative measures, budget allocations and agreements between actors may be required, as well as spatial planning and building regulations. Explicit identification of the risks creates the opportunity to handle them as part of the design, thereby supporting their acceptance, as well as that of the ecological elements included in or brought about by the BwN project.

Step 3) Evaluate and select alternatives

Once a system analysis has been made and a range of alternative conceptual designs is generated, a third step is to filter the alternatives and elements that have potential from those that have not: survival of the fittest.

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Test the prerequisites

It is important to note that most of the prerequisites (e.g. standards) are vested in traditional assessment philosophies, which may be no longer valid for BwN-projects. Therefore, also the prerequisites need to be reconsidered (see also Next phase).

Test for realism

Next, one needs to assess to what extent the alternatives are realistic. In general a project is realistic if a) it has perspective to achieve set objectives; b) it is financially viable; c) it is economically advantageous; d) it is technically feasible; e) it is ecologically sound and f) it is socially and legally acceptable. These different domains of realism are dealt with in more detail in the Section Planning and design.

Testing possibilities

Most innovations require study and testing, which take time, sometimes years. On the other hand, large infrastructural projects often take many years until they reach their final design. In that case there is time to test innovations, focusing on the most critical assumptions, processes and options for optimization. Innovations that show perspective should therefore be put on the agenda early in the planning process. Scouting promising innovations that require time to mature is an important activity in the project initiation phase. See also Section Governance.

Comparison and selection

Selection of alternatives is part of all phases of a project. Selection involves the use of information, models (implicit or explicit, conceptual or formal) and expert judgment. The procedure is further fed by examples from elsewhere and tests as described above. The usefulness of most of these techniques depends to a large extent on the notion of how the ecosystem and the socio-economic system function. Although information may be scarce, inaccurate and uncertain, especially in the early stages of the project, realism is required to prevent that too much time and effort is spent on analyzing unrealistic alternatives.

An appropriate decision making framework is essential when comparing and selecting alternatives. It includes indicators and criteria to assess impacts on stakeholders (People), socio-economic costs and benefits (Profit) and interaction with the environment (Planet). It considers a sufficiently long time frame to take all relevant aspects into account and establishes costs and benefits of the different possibilities, also in terms of ecosystem services (productive, as well as regulating, cultural and supporting).

Step 4) Elaborate selected alternatives

In every project phase, selection reduces the range of alternatives and elaboration of the remaining alternatives further specifies the project. Obviously, this process takes place within the given set of goals, prerequisites, practical restrictions and regulations.

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Optimization of the alternatives

A first round of optimization of BwN alternatives should at least involve:

- **Methods of execution:** Relevant aspects of the execution of the project need to be identified, as these are not always obvious for a BwN project. It is important to assess whether a proposed method of work is feasible or not, A BwN project is often determined by the way it will be implemented, especially if use is made of natural processes.
- **Time frame:** A BwN project does not end when the construction is completed. Especially biological components (vegetation, communities of species) need time to develop. Therefore, a BwN project may take longer to reach its final state than a traditional construction work. Yet, it has to function in the developing stage, as well. This may influence the feasibility of the project and therefore needs to be given due attention as early as possible in the development process.
- **Promotion of the approach:** It is important to convince actors, stakeholders and the public of the attractiveness of a certain BwN solution. Show them the advantages and perspectives of the solution in terms that appeal to them and involve them in the selection process. If people appreciate the added value of a BwN approach, they will be more cooperative and supportive.

Embedding of the BwN alternatives

In order to get relevant stakeholders involved in the project, the following steps need to be made:

- **Stakeholder analysis:** Identify the relevant stakeholders, their stakes and their position in the decision making process. Note that stakeholder positions may change during the process. Therefore, stakeholder analyses should be repeated from time to time.
- **Stakeholder involvement:** Establish a network of the relevant stakeholders and use this to inform and involve them as early as possible in the process. With the stakeholders involved from the start, the design can be optimised to stakeholder wishes and requirements and they can bring in information, ideas and creativeness. Thus they become part of the solution, instead of part of the problem.
- **Collaboration:** There may be other ongoing projects where a similar BwN solution is implemented. They can act as pilots for the project at hand: experiences, expertise, ideas and maybe even costs can be shared. Therefore check whether such projects exist and, if so, seek collaboration.

For further suggestions on how to prepare BwN alternatives for the next project phase, see: Section Planning and design - Elaborate.

Step 5) Bring results to the next phase

The final step is to set the stage for the Planning and Design phase. This may also imply the options for pilot testing and additional field work. It will result in the assessment of the full potential of the remaining BwN-alternatives. Furthermore it involves the exploration of co-financing possibilities if multiple objectives are served. Also, uncertainties will be considered.

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Test potential performance

Each remaining alternative has to meet the project objectives, in terms of functionality, but also in terms of cost-effectiveness, robustness, resilience, sustainability and embedding in the environment. By definition, BwN-projects involve a natural component of which the evolution is not exactly known. This has to be tackled in the design and needs to be taken into account when considering the performance of such projects.

Testing is often done on the basis of effect studies. In the Initiation Phase information is often limited as are the possibilities to do in depth assessments. Much does rely on expert-judgment and comparative analyses with reference situations. Some quantitative assessment may be needed also in order to underpin cost estimates that are related to operation and maintenance.

In this phase testing should mainly be on:

- Essential requirements that must be met in order to make an alternative potentially realistic. This is often an issue of identifying accompanying measures and conditions in order to “make it work”.
- Long-term development, since focus should be on structural solutions, initiation of desired developments and low maintenance and operational costs.
- Qualitative comparison between alternatives, in order to allow for a pre selection.
- Possible win-wins with other projects and policy objectives, that need to be taken into account in the next design phases and may positively influence the performance of the project.

Alternatives can be discarded because they are expected to be too expensive, too uncertain or not in line with the prevailing laws and regulations. Many arguments against a certain idea can be countered by proving otherwise, optimising the design, consultations or the alteration of financial mechanisms and legal interpretations. Note that for a fair comparison of alternatives it is necessary to take a lifetime perspective, also in terms of costs, benefits and adaptation potential.

Allot time, space and budget to pilot tests

Most BwN alternatives require testing before effective optimization and application is possible. Many projects run on tight schedules, with no time available for pilot tests, but quick and small field tests may suffice. If not, more elaborate tests should be scheduled and one might even consider postponing previously set deadlines for project execution.

Stimulate BwN in contracting and scope

Another important aspect is related to the definition of the scope and the selection criteria (also in relation to contracting) for the next phases. If possible, incentives should be included that trigger participants to explore the BwN potential. In the contracting phase this may imply including criteria that favour environmentally attractive solutions. (See Innovative Contracting).