Drainage and Wastewater Management Plan

Our 'Green First' Framework

May 2023

South West Water

Contents

Foreword

The natural water cycle and catchments of the South West, with their distinctive geology, climate and maritime features, have been modified over centuries by agriculture, tin-streaming and many other influences. In more recent years, the water sector, along with other organisations and landowners, have turned to natural processes and nature-based solutions, to provide viable alternative options for managing wastewater. Such solutions often bring wider public benefits, have a lower carbon footprint and can be better value for money than traditional, engineered solutions.

During the Victorian era, the roll out of combined sewerage systems achieved a significant improvement in public health. These systems improved public sanitation by collecting sewage and then transporting the effluent to treatment locations where a basic level of treatment could be applied before returning it to the environment. This type of system has a dual role as, in addition to removing raw sewage, it also collects excess rainwater, preventing flooding and helping to drain the catchment.

It is now clear that this system of mixing sewage and rainwater is no longer acceptable or fit for purpose, and as an industry we need to consider the most effective and efficient way to adapt and transform our sewers and drainage networks to deliver better outcomes for our customers and the environment.

At the heart of this transformation are two philosophical principles about the operation of our systems:

1) The first of these focuses on **increasing the capacity** of the system to hold and store the mixture of rainwater and sewage and to return this to the environment safely. These measures are referred to as **'Grey'** or engineered solutions, as they typically involve laying pipes and pouring concrete to create new storage tanks. On the plus side, we know how to deliver this approach, which mirrors the engineering principles of the Victorians, and we have confidence in its ability to deliver the solutions we seek. However, this approach only treats the symptom, rather than the cause, and it cannot adapt to changing pressures on the system resulting from climate change or other societal changes. In addition, any solution of this type will have a limited 'asset life', as input flows will increase over time, and we will eventually need to increase the storage capacity of the system again.

2) The second principle is to focus on **preventing rainwater entering the sewer** in the first place and keeping it separate from the sewage by either holding it back in the landscape or diverting it via alterative drainage routes to be returned safely to the environment. There are a range of different solutions available that can achieve this, including Sustainable Drainage Systems (SuDs), Rain Gardens, Surface Water Separation (SWS), infiltration reduction or property-level storage. All achieve similar outcomes by providing an alternative destination for the rainwater. We call these **'Green'** solutions or **Nature-Based-Solutions (NBS)**. These solutions are likely to be more sustainable and because the surface water never enters the sewer, offer longer term resilience to the increasing impacts of climate change. In addition, these solutions can also deliver multiple

additional benefits over and above the primary water management solution. However, there are barriers to the adoption of green solutions, for example, they can require more space, take longer to implement and require specialist skills and expertise to deliver. They can also require more extensive engagement with stakeholders to co-create and potentially co-fund the solutions.

Clearly there is a balance to be struck between these principles and it is likely that any programme of improvements will be a mixture of these different solutions. The decisions to select these solutions are likely to be driven by practical issues such as the availability of land, time available implementation, economic choices, engagement with stakeholders, as well the certainty of outcomes. These choices tend to be driven by site-specific issues within each catchment and it is very difficult to predict exactly where each solution would be most appropriate. This is why our plan contains a mixture of both types of solution.

In the development of our investment programme, we have adopted the principle of **'Green First'**, which assumes that a nature-based solution will be considered from the outset and then applies a decision-support framework to determine how the solution may be adapted and amended from this starting point. The Green First Framework set out in this document will form the decision-making process we will apply through the delivery of the programme.

Introduction

Our Drainage and Wastewater Management Plan (DWMP) sets out a framework approach to the utilisation of NBS as a method to address flooding and storm overflow spills. Nature-based solutions are important because they provide an opportunity to deliver interventions that are more sustainable, deliver additional biodiversity benefits and can provide a more beneficial outside space for people to enjoy.

Our starting point with the 'Green First' approach is to utilise NBS and natural flood management wherever possible and practicable to do so. As such, our planning assumptions are based on achieving 50% of the flow reduction through nature-based solutions through a minimum removal of 10% of the impermeable area.

This document explains the strategic approach which has been taken to maximise the potential to prioritise the selection of nature-based solutions as a tool to resolve a flooding or storm overflow need.

What are Nature-Based Solutions?

The European Commission[1] defines NBS as solutions that "*provide environmental, social and economic benefits and help build resilience"* by bringing *"natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient, and systemic interventions.*" As a result, NBS "*benefit biodiversity and support the delivery of a range of ecosystem services.*"

NBS can consist of natural or semi natural systems and can include:

- Diverting high water flows and creating areas to store water.
- Creating leaky barriers to slow water flow in streams and ditches.
- Restoring salt marshes, mudflats and peat bogs.
- Planting trees and hedges to increase water absorption, catch rainfall and slow down surface water run-off.
- Improving soil cover with plants to reduce water pollution and run-off.

What is Natural Flood Management?

Natural Flood Management (NFM) can be described as *"… when natural processes are used to reduce the risk of flooding and coastal erosion. Examples include: restoring bends in rivers, changing the way land is managed so soil can absorb more water and creating saltmarshes on the coast to absorb wave energy."*[2]

[1] Nature-based solutions (europa.eu)
[2] Natural flood management – part of the nation's flood resilience - GOV.UK (www.gov.uk))

Our experience of delivering nature-based solutions and natural flood management

We have extensive experience of catchment management, including peatland restoration, which we have delivered in partnership across the region since 2010.

Our Upstream Thinking project is a multi-award-winning catchment management scheme which applies natural landscape-scale solutions to improve water quality and supply.

The project is delivered through a unique partnership between South West Water, Westcountry Rivers Trust, Devon and Cornwall Wildlife Trusts, South West Lakes Trust, government agencies, environmental experts, landowners and tenant farmers, whilst the evaluation of the change in water quality at catchment scale is undertaken by the University of Exeter.

As well as improving water quality, the interventions also slow the flow of water across the landscape and reduce flood risk.

https://www.southwestwater.co.uk/environment/working-in-the-environment/upstream-thinking/

What are Green, Blue and Grey Solutions?

Within this document we refer to three different categories of solutions or process types called Green, Blue or Grey. A simple definition of these categories is:

- **Green** – Semi-natural spaces and assets that use ecologically driven processes to treat and slow or stop rainfall runoff. These options enhance the urban environment in a variety of ways
- **Blue** – infrastructure includes the ponds, waterways, wet detention basins and wetlands within a drainage network
- **Grey** – Traditional engineering solutions such as tanks for storage of combined and foul flows.

These process types are not standalone and can be used in combination. An example of this is Blue Green Infrastructure, described as *"… an interconnected network of natural and designed landscape components that may include ephemeral, intermittent and perennial water bodies, and open, green spaces… e.g. water butts, green roofs, trees in pit planters, swales, rain gardens, wetlands, detention basins, retention ponds, re-naturalised and de-culverted rivers, and reconnected floodplains… all of which are designed to turn 'blue' or 'bluer' during rainfall events in order to reduce urban flood risk and increase water security."*[3] Both NBS and NFM would fall into the Green, Blue and Blue Green Infrastructure categories.

It is also possible to have Integrated Green Grey Infrastructure, which is the 'greening' of grey assets[4].

[3] Urban flood risk management: the blue–green advantage | Blue–Green Cities (icevirtuallibrary.com)
[4] Greening the Grey: A Framework for Integrated Green Grey Infrastructure (IGGI) - Enlighten Publications (gla.ac.uk)

Figure 1 (below) is an illustration from the Framework for Integrated Green Grey Infrastructure[5] demonstrating that there is a spectrum, or potential for hybridisation, within the Green, Blue and Grey infrastructure types.

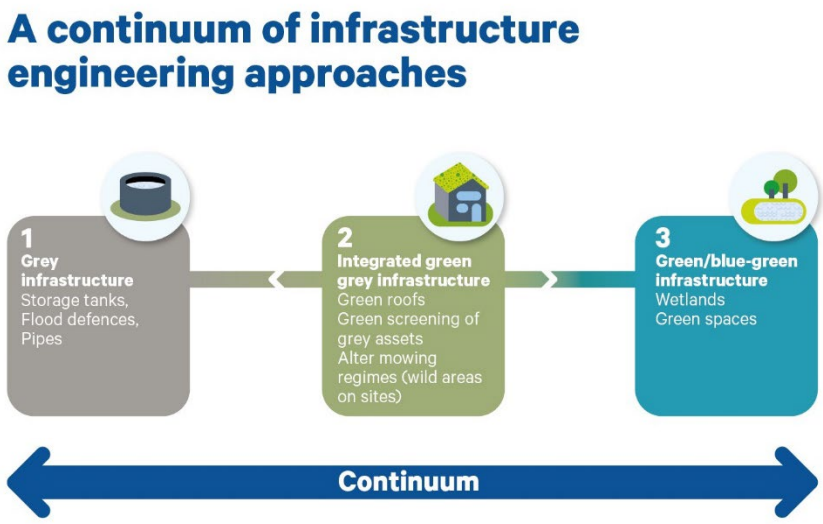

Figure 1: *Illustration of the Green, Blue and Grey infrastructure spectrum from Greening the Grey: A Framework for Integrated Green Grey Infrastructure (IGGI), 2017*

What we have said in our DWMP

In our DWMP we said the following:

- Our preferred scenario will work with natural processes where possible across the region, reducing the amount of carbon used to manage wastewater over the next 25 years.
- We have planned for at least 10% of the available surface water area of our interventions to 2030 to be NBS, as we know from our experience of catchment management over the last ten years that working with natural processes to manage wastewater and rainwater also enhances the environment and brings wider public benefits important for our customers and communities to visit and enjoy. Over time this figure will increase as we look to put Green First.
- This 10% of available surface water area equates to approximately 50% of the surface water flow in the catchment, with the remaining 50% being tackled through storage. Ultimately this is more of a balanced position between nature based and grey solutions. Additional benefit can be sought by green solutions identified upstream as there is a direct benefit on reducing the load on existing and required grey infrastructure.
- Our approach is to ensure that bills are affordable in the short term and are committed to the exploration of green solutions as our

[5] Greening the Grey: A Framework for Integrated Green Grey Infrastructure (IGGI) - Enlighten Publications (gla.ac.uk)

default position for future intervention. We recognise that a blend of investment is required, to mitigate the risk associated to legal targets and provides opportunity to adapt our strategy to the growing climate change risk – which is a concern of our customer and stakeholder.

Whilst NBS and NFM has great potential benefits, there are also risks and uncertainty that need to be managed. As we have greater certainty in the delivery and outcomes with traditional grey solutions, these may be preferable to manage and deliver short term regulatory targets and requirements, whilst we develop our understanding and application of Green, Blue and Blue Green Infrastructure solutions.

South West Water's Green First approach will help to make the shift and by applying, monitoring and evaluating of Green, Blue and Blue Green Infrastructure solutions, perhaps in lower risk situations such as a multiple solution approach, that risk and uncertainty is likely to reduce changing perception and knowledge on these approaches over time.

What our Customers, Stakeholders and Regulators have told us

As part of the consultation process of the draft DWMP, we actively sought feedback from customers, stakeholder and our regulators to get their views on the role of NBS's in the DWMP. Figure 2, 3 and 4 (below) summarises some of this feedback.

"We are concerned that companies have not been able to satisfactorily prioritise green /nature-based and low carbon solutions such as surface water removal or separation, where feasible."

Ofwat

"We believe Nature-Based Solutions should be considered throughout the plan and beyond 10% where possible and we would expect the proportion to grow over time as the knowledge base of South West Water and the wider water industry increases."

Figure 2: *Summary of Regulator feedback on the draft DWMP*

Customers believe a compromise between nature-based and engineering is 'the best option' for the DWMP, rather than increasing the capacity of the existing system

They instinctively like the idea of working with nature to reduce or slow how quickly water enters the drain.

Customers have mixed views on whether they prefer engineered solutions with the associated disruption from retrospectively making the changes, or the lower certainty of nature-based solutions.

Figure 3: *Summary of customer feedback on the draft DWMP*

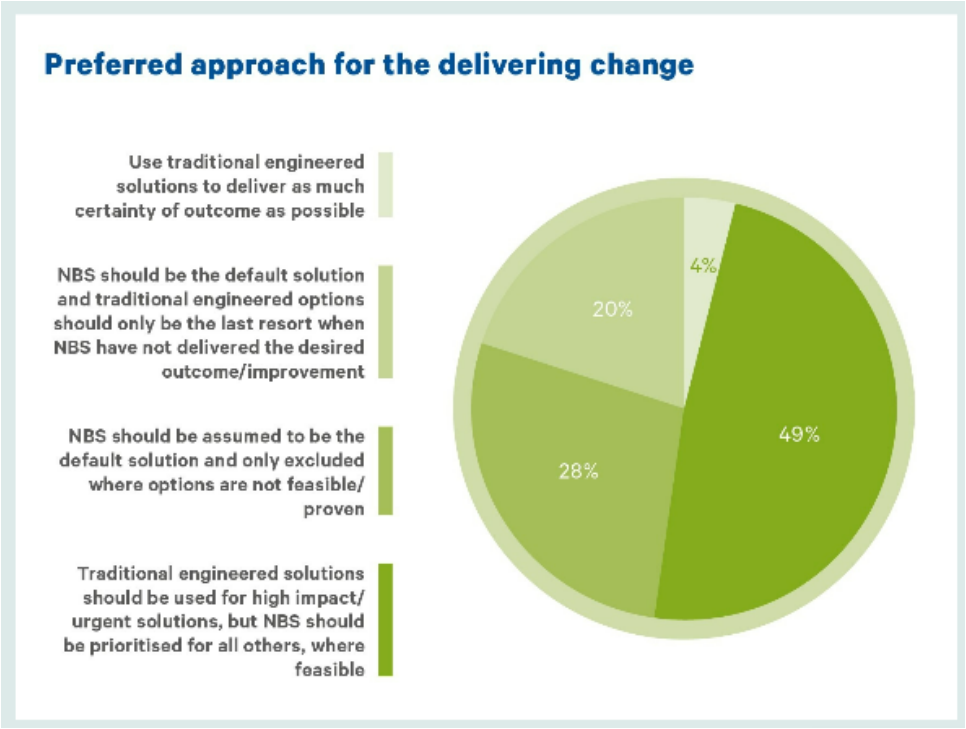

Figure 4: *Summary of Regulator, Customer and Stakeholder feedback on the draft DWMP*

Significantly, customers told us that they wanted to see the benefits of flooding and storm overflow improvements delivered quickly. To achieve this ambitious programme more quickly, there needs to be a balance between Grey solutions alongside Blue and Green solutions, particularly in the first five years. This is because NBS requires careful planning and partnership working, which may result in a longer lead time due to the additional care required to design and deliver a more sensitive solution which will meet the needs of all stakeholders.

"Traditional engineered solutions should be used for high impact/urgent solutions, but nature-based solutions should be prioritised for all others, where feasible."
Stakeholder at DWMP workshop

Our customers are interested in catchment and NBS but express that they don't fully understand how they work or what the impacts of these schemes may be. Customers welcome our approach to these solutions but recognise that these types of interventions may cost more and take longer to deliver.

Where there are more urgent interventions required with greater certainty, we will look to prefer more traditional, engineered solutions such as increased network and treatment capacity.

In addition to the feedback we received, we understand the importance of a NBS approach within the DWMP.

DEFRA wrote in the DWMP guiding principles that they

"… expect companies to consider green infrastructure, nature-based and low-carbon solutions to mitigating risk, such as sustainable drainage systems, where possible…"

and that

"In helping to protect and enhance the environment, we expect DWMPs to consider the use of nature-based solutions, where feasible, as part of their option development and assessment."

We understand the importance and benefits of NBS, and we need to better demonstrate that understanding. But we also recognise that we need to demonstrate clearly when NBS is not a feasible option.

Response to feedback

The feedback provided further clarity on other stakeholder positions to NBS. The learnings from this are captured within our Statement of Response document; in summary our learning was:

- We know it is important to balance resolving urgent and high impact issues quickly and using NBS, which typically take longer to deliver benefits, may not be practical in all situations
- We will build a plan that explains where we'll deliver NBS in this next five-year period and build our capability ready for AMP9 to deliver a greater proportion of these solutions
- By 2040 we aim to deliver higher level of our solutions through nature-based approaches equivalent to 75% of flows being reduced through NBS with only 25% delivered through storage.

The challenge for us is to balance a number of criteria for a solution, such as regulatory timelines, urgency and frequency (e.g. is it an issue now or a predicted issue in the future due to climate change and/or population growth). All these different facets need to be taken into account in order to select the appropriate solutions type(s). There will be some interventions where timescales may limit the possibility of NBS, such as the accelerated catchments for SO interventions.

Methodology to a Greener and Nature-Based centred strategy

In response to feedback received on the draft DWMP, we are publishing the Green First approach to demonstrate how important we consider NBS to be and our aspirations to utilise NBS and natural flood management techniques. We recognise that this aapproach is a step change from the traditional engineered approach, i.e. Grey solutions, and that the whole industry, not just SWW, is on a journey to be ready which will involve changes in culture, skills, capability and trust alongside a step change in our contracting and decision making processes.

There needs to be a period of learning in NBS for the organisation, the water sector and regulators to improve confidence in the certainty of solutions. In addition, there needs to be a better understanding of where we can and what the options are for hybridising between Green, Blue and Grey solutions, such as Blue Green Infrastructure and Integrated Green Grey Infrastructure mentioned previously, to maximise the potential for additional benefits to any solution and strengthening the Green agenda.

Between the Draft and Final DWMP we have continued to explore the green solutions in our Falmouth Catchment case study. A high number of interventions in several locations across the catchment have been identified as suitable for green/blue solutions ahead of grey solutions. We intend to further progress this with our local stakeholders to increase the level of co-development and mutually beneficial outputs. While there remains a journey to finalise the optimal investment programme for Falmouth we are well on our way to achieving our Green First ambition.

Our Commitment to Nature Based-Solutions

Within the DWMP, our planning assumptions are based on minimum of 50% of the surface water flow of our interventions being NBS, with an increase to 75% by 2040. In addition to these statements, to maximise the potential for Green, Blue, Blue Green Infrastructure and Integrated Green Grey Infrastructure interventions and demonstrate our ambition to NBS, we want to adopt a principle of "Green First" from the onset of solution identification once a project need has been identified.

Our Green First approach will mean we always begin the scoping of each solution by looking at whether Green options would be appropriate, moving through the Green, Blue, Grey spectrum (as described on page 7) if not. However, there will always need to be a balance of the use of NBS and meeting urgency and certainty for a solution, which means a Blue or Grey solution (or hybrid such as Blue Green Infrastructure or Integrated Green Grey Infrastructure discussed earlier) may be more practical.

We recognise that a best value solution cannot always be "Green" only. But by starting at Green, rather than the tradition of starting at Grey/traditional/known solutions, we will come to practical, best value solutions that will always look to provide as much environmental/biodiversity and societal benefit as is reasonably practicable, in addition to resolving the initial need.

Our Starting Point

Our Green First approach is a significant change to the way that we will scope and deliver our solutions. We will work with our stakeholders, delivery partners and colleagues to prepare to deliver this change to the way we work, developing new business processes and forming new and strengthening our existing partnerships.

Beyond developing and delivering solutions, the key to making our approach sustainable is creating a framework for NBS in our region. We will need to ensure that we have the right skills and capacity both within our businesses and through our partners and stakeholders. And we will work with them to develop capability over time where needs are identified.

The solutions that we will begin to deliver in AMP8 will be underpinned by a broader structure that will enable us to make decisions on the most appropriate type of solution. We will need a decision support tool, an example of which is shown below in Figure 5, to find the right balance between green, blue and grey solutions.

Figure 5: Our decision-making process

How Green First works

We have developed an appraisal process to understand the opportunities and challenges that taking a green first approach to each solution will present and evaluate these against a set of criteria.

Figure 6 demonstrates how the Green First approach could be applied once a project need has been identified. The Green First approach will take a project need and by default start on the assumption it can be solved by Green Infrastructure/NBS, hence 'Green First'. The 'solution team' must travel through the series of questions left to right, answering whether Green interventions can be the solution. If Green interventions are not appropriate to that question, they move down to Blue Green Infrastructure, then Blue, then Integrated Green Grey Infrastructure and finally Grey. We anticipate that solutions are likely to be a combination of green, blue, and grey integrated approaches in many cases.

Decision Making Tool

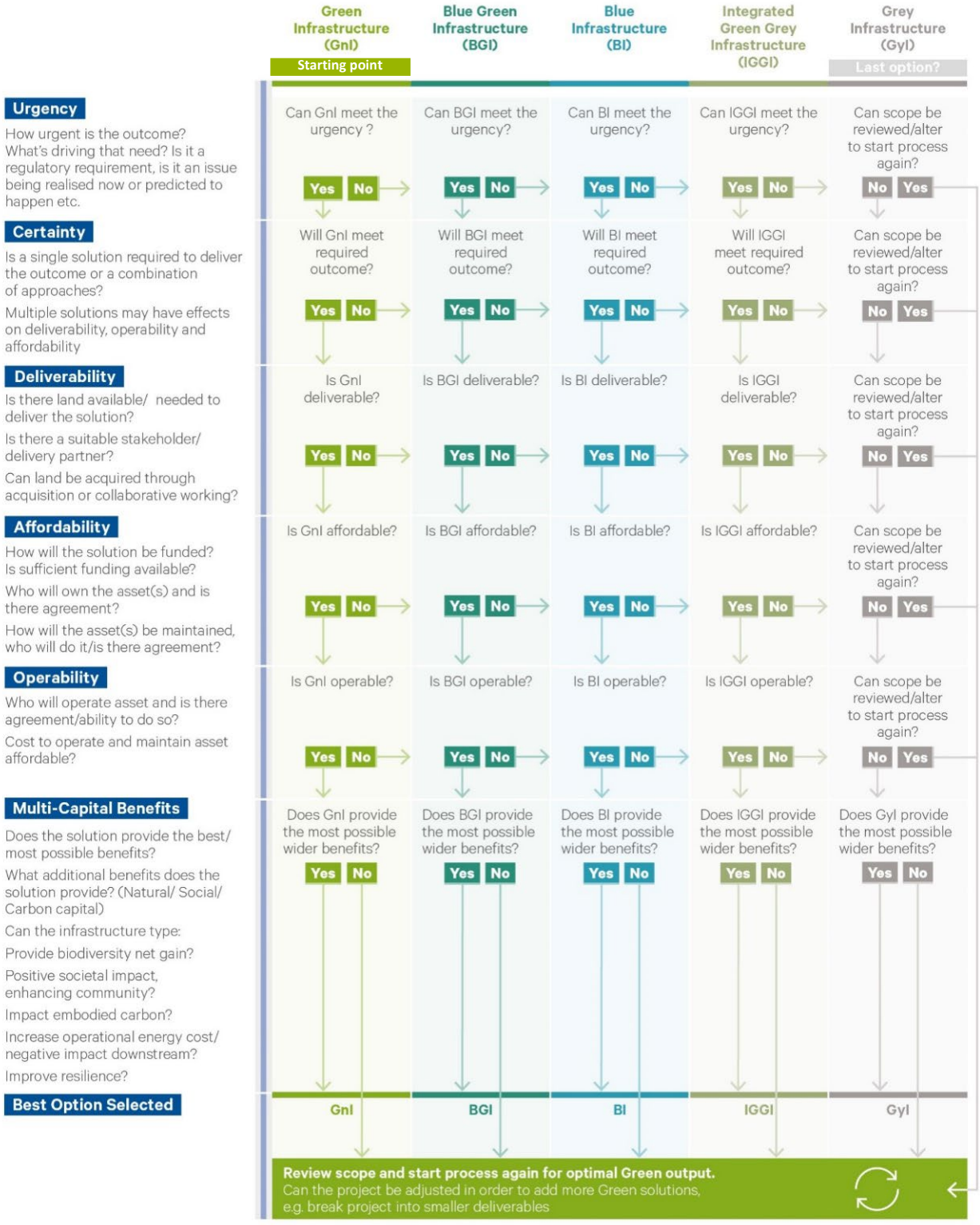

Figure 6: Green First Development Tool

The changes our approach will deliver

The strategic intent of our Green First approach is to change how we take decisions about the investments we need to make, broadening our consideration to include alternative approaches. This builds upon feedback from regulators, customers and stakeholders and seeks to balance the pace of delivery, keeping bills affordable and the needs of our environment. We know that green and blue solutions typically offer a wider range of benefits beyond those immediately scoped by the scheme and we will take these into account as we make decisions about the best value solution.

We expect our approach to:

- Continue to consider multiple benefits when selecting solutions (i.e. is there a flood risk and as well as Storm Overflow risk?)
- Search for Blue Green opportunities (i.e. surface water system which discharge into Combined sewers).
- Look to remove unwanted flows (rural, slow response runoff, discharge from land drainage into sewer etc).
- Continue to search for shared opportunities with stakeholders.
- Ensure that storage solutions are not serving catchments with excessive rural, permeable, and slow response flows.
- Liaise frequently with stakeholders to ensure that catchment solutions are prioritised.
- Consider the benefits of Blue / Grey solutions when considering adaptive pathway (i.e. alternative plausible futures – high climate change).
- Be innovative, and embrace the adoption of creative solutions where applicable
- Ensure that systems are operating at optimum conditions before delivering new projects (i.e. pump pass forward).
- Stimulate thinking and confidence in NBS, increasing knowledge gain through delivery, monitoring and evaluation.

We know that this change will require us to demonstrate environmental leadership and we've heard from our customers and stakeholders that this is important to them. For us, that leadership also means that we will not:

- Remove options based solely on who owns the asset or concerns about maintenance of non-standard assets.
- Promote a grey solution if a Blue / Green solution and its associated benefits have not been properly assessed.

Next Steps

We acknowledge this is the start of a journey and we are committed to getting the business ready for the 'Green First' approach. We are scoping a culture change programme across the organisation, as well as assessing change readiness by understanding the capability of our people and changes that may be required to our systems and processes. In order to successfully implement this approach, we need to develop a framework to deliver it. It will involve a business transformation and culture change in our approach. This requires education of our staff and partners as well as exploring and learning from projects to build capability.

In preparation for the future, we are developing an enhanced framework of partners and suppliers to support delivery, with long-term contract terms. Skills and capabilities will increase both within South West Water and also in our supply chain as we continue to deliver more NBS, enabling us to increase our ambition as we move forward in the future.

In addition, over the last 15 years we have co-delivered nature and catchment-based solutions with our Upstream Thinking Partners and local landowners. We know that working with our partners who are already embedded in the landscape can deliver solutions which bring wider public benefits for communities .

We will work closely with a range of suppliers and partners to deliver on our NBS ambitions. We will ensure that our scope of delivery is scaled appropriately, enabling local partners to support us in delivering our programme. In this way, we can build upon the relationships that those partners bring, with local communities, landowners and other interested parties to maximise the impact and to support our traditional supply chain to deliver local benefits.

We know that we will need to innovate, to approach problems differently and to look at a systems-based methodology to deliver schemes from multiple drivers within catchments.

In May 2023 we received news that our Water Net Gain project with West Country Rivers Trust as the lead delivery partner, has won funding from Ofwat's Innovation Fund. Although this is focussed water resources and drought resilience, it will help us to learn more lessons about NBS. This project will incentivise landowners and farmers to store water on their land for gradual release into the river during periods of drought.

We are also a partner in a second project – Mainstreaming Nature Based Solutions – which also received Ofwat funding to create a national programme to mainstream NBS across the sector.

Our initial assessment for a delivery framework for NBS has identified the six key areas we need to consider and develop, shown in Figure 7 (below).

Governance

- Project outcomes and critical success factors must be in place
- Exploration of funding sources -such as Ofwat's innovation fund – to maximise investment in NBS
- Ensuring Green and Blue options have been taken into account

Enablers

- Incorporation of NBS into the asset management system
- Digital tools to streamline the process of delivery and management
- Digital tools to screen options, and assess and compare environmental and social benefits

Ways of Working

- Asset management
- Updated delivery models e.g. consultants/contractors; NGOs, community groups
- Links to other policies, such as Biodiversity Net Gain and planning

Monitoring & Evaluation

- Design of a monitoring framework for any early NBS measures/schemes; in particular, wetlands and coastal measures
- Links with other types of NBS
- Links with other NBS programmes or activities e.g. Environment Agency, local authorities, commercial seaweed farming

Stakeholder Engagement

- Strengthening the way we work with others
- Cultural change with internal stakeholders
- Co-creating, co-development and co-funding
- Working with research organisations

Closing the Skills Gap

- Identifying future skills needs
- Developing engineering and programme standards for all types of NBS
- Requiring delivery partners to demonstrate their commitment to Green First

Figure 7: *– Key areas for development and consideration*

This approach and delivery framework will help to ensure that South West Water remains receptive and willing to implement NBS. The approach will also help South West Water build confidence in designing, delivering and monitoring these solutions, whilst delivering best value for our customers and positive enhancement of the environment.

We have published our Green First framework alongside our DWMP to seek feedback from stakeholders and regulators around our approach. Any feedback can be sent directly to our DWMP mailbox dwmp@southwestwater.co.uk.