

LANDSCAPE LED DESIGN

Wim Timmermans



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Norton Road 45

Carden Avenue 45

Darent Valley 67

CAMBRIDGE

HARWICH

SHOREHAM

FOLK

HASTINGS

EASTBOURNE

BRIGHTON



EAT YARMOUTH

RAMSGATE

DOVER

STONE

CALAIS

DUNKERQUE

OOSTENDE

City River Oostende 37

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BELGIE

FRANCE

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| Foreword

LANDSCAPE-CENTRAL

Unfortunately, climate adaptation is not a short-term process. The spatial impact of climate change will be particularly severe in coastal areas. Necessary adjustments to the water management regime will therefore be drastic and take time to design, plan and implement. Moreover, owing to their size and character, these will have an impact on the coastal landscape and on the way in which this landscape is appreciated today from a leisure perspective. This makes it extremely important that projects such as SCAPE have the confidence to put the landscape and the long-lasting interplay between geology, economy and inhabitants at the centre of its thinking about climate adaptation.

With its Landscape Led Design principles, SCAPE brings pragmatism to the current debate on climate-adaptive approach to coastal areas. Authorities currently see themselves mainly as problem-solving instruments at the service of society. Complaints are not articulated by these authorities, but by the public, here and now. The authorities then look for answers in a goal-and-outcome oriented manner and come up with some technical, 'engineering-based' solutions that often have to be repeated every year. However, the real causes of the problems, be they historical or structural, remain untouched. By (re)connecting with the inherent vertical and horizontal logics that are present in the landscape and also shape it, the SCAPE project tries to challenge established approaches to water management. In this instance, working with landscape conditions to develop solutions becomes more prominent. Climate adaptation is therefore not limited to the current physical interventions by the authorities,

but becomes a fully-fledged societal exercise of co-design, in which authorities and communities redefine the norms of behaviour for countless individuals.

SCAPE rightly opposes the current, dominant practice of using the landscape as an afterthought, as a visual remedy for mainly technical solutions. The danger of a different kind of dominance lurks around the corner: that of an aesthetic design that moves rapidly away from any knowledge of hydrological, geological, ecological and socio-economic processes in the landscape. After all, such a design approach could result in the umpteenth green pendulum that is set down on paper by a designer with a grand gesture, but which in practice turns out to be at odds with soil conditions and water management and will in no time manifest itself as withered and worthless plants on the site. In other words, the engineer's notion of manipulability is no stranger to many so-called landscape designers either. SCAPE should therefore be read as a plea to generate and add value to the multi-scale knowledge about the landscape and related processes from the very start of a climate adaptation project, across disciplinary boundaries. The layer approach and the 'casco-concept' (framework concept) from the Netherlands are already several decades old, but they illustrate excellently how to involve the time dimension present in the landscape in the design. The layer approach assigns a different structuring effect in the landscape to the slowly changing subsurface, networks and the rapidly changing occupation layer. The casco-concept works with a low-dynamic framework for the slower processes in the

landscape and with intermediate meshes that can be filled in by high-dynamic activities. Without knowing it, they were probably Landscape Led Design before its time.

As it happens, by taking the relationships in the landscape as a starting point for developing climate adaptation strategies, SCAPE also opts for a systemic approach. Whereas technical solutions often suffer from myopia and do not consider the effects that one intervention causes in other places or at other times, Landscape Led Design is essentially about turning dials in a complex system. After all, landscape is a holistic construction, ecologically, technologically, socially and culturally. At first sight, this seems to lead to greater complexity as regards content and, consequently, to greater inertia in decision-making. At the same time, however, this approach also has the potential to enable various actors to detect and define shared opportunities. Not only does landscape, more than any other 'spatial' knowledge domain, offer a common language, it also opens up perspectives on linkage opportunities, as they are known, whereby climate adaptation objectives are linked to ambitions in terms of nature, agriculture, renewable energy or recreation. In this way, the achievement of climate-adaptive measures may also become a shared financial challenge. *It's the landscape, stupid!*

Hans Leinfelder

Senior lecturer at KU Leuven

LANDSCAPE LED DESIGN: AN INTRODUCTION

Developing, implementing and learning about climate adaptive solutions.

New solutions for climate adaptation are being developed as part of the SCAPE project. SCAPE focuses on water management solutions that can be applied to coastal areas along the North Sea and English Channel. Many lessons are being learnt as solutions are being developed, implemented, disseminated and discussed simultaneously.

SCAPE (Shaping Climate change Adaptive PlacEs) is a European project in which the landscapes are adapted to reduce the impact of climate change on water management. It takes account of the natural landscape of a place and its specific requirements. For example, a polder requires a different approach to that for a valley.

Urban, suburban and rural landscapes

SCAPE partners are working collaboratively to develop and test solutions at six locations bordering the North Sea and the English Channel. Two of these areas are located in dense, urban areas, two in rural areas and two more on the fringe between urban and rural. The idea is to develop water management solutions that can help these areas better prepare for increasingly extreme weather conditions, such as heavy rainfall and long periods of drought, which are expected to occur more frequently in the future due to climate change.

Project manager Gwenny Cooman explains: “We’re not looking for traditional, highly engineered principles where everything

is solved on a purely technical basis. Our work is based on the principle of Landscape Led Design." "In the fifties and sixties, everything was generally concreted over and complemented with underground sewers and architectural interventions," adds her colleague Karel Vanackere. "Excess water had to be removed as quickly as possible, and we've called a halt to that thinking. We choose a different approach, where we start with an extensive analysis of the landscape of an area. We ask, how is it put together, how did it come about? We do this with the help of water managers, landscape architects, planners, architects, archaeologists, and ecologists."

Climate test

This is a different way of thinking and doing. In the past, if there was a problem with the water, a solution was found immediately, but in the SCAPE project, the landscape is first analysed in depth to determine what is currently happening, and how the water system works. What are tasks ahead, such as housing, recreation, climate developments, now and in the longer term? How is the climate likely to change? What are the consequences in terms of rainfall and drought? With these things in mind, experts from the Scheldestromen Water Board and the Flanders Environment Agency (VMM) have developed a flexible assessment framework called the Climate Test. This framework has been used to test each pilot and their own integrated solutions.

Effect

The pilots have now largely been implemented and completed. It is now time to take stock and determine what has been the effect of all this work. How has this been measured? "It has been quite a puzzle," says Vanackere. "For example, it's easier to count or measure how many trees have been planted or how much rainwater no longer disappears into the sewers. However, a tree needs time to grow and groundwater does not rise overnight. Which means you will often have to resort to estimates." "The climate change developed gradually," adds Cooman, "and it will take some time for the measures you take now to have the optimum effect."

LANDSCAPE LED DESIGN:
RE-CONNECTING TO
THE LANDSCAPE

Landscape specialist Ruth Childs introduced the principle of Landscape Led Design in SCAPE. She explains that the development of an area can follow the natural processes to maximise benefits and minimise harm.

Ruth Childs works at the South Downs National Park Authority. Her role involves advising upon new development plans with Landscape Led Design forming the basis of her work. As Ruth explains, “The landscape is the living result of a long-term interplay of relationships between people, nature and the changing fortunes of communities.”

In new developments, balancing change with the capacity of existing landscapes is a challenge. In every landscape, these relationships will determine how a landscape comes together to create a distinctive place. Sensitive landscapes often demonstrate a coherence in these relationships in space and through time. Ruth provides some examples from her current role in the South Downs National Park.

Examples

Over the past 30 or more years, there has been a tendency to channel excess rainwater into pipes and drain it off into a pond for storage. The landscape can do so much more when it comes to understanding natural processes. Excess rainwater can be cleaned, stored and retained within the soil. Applying the principles of Sustainable Drainage and nature-based solutions is beginning to change the way we design new places.



The 'spring line villages' in the South Downs is a good example. In an area where springs are located along a geological fault line in the subsurface, a line of settlements has evolved. In some cases, a settlement consisted of a farm and in others a village or town. They owe their existence and development to those springs where settlement has a strong relationship to geology and water. The way they developed depended on several factors, such as accessibility and the entrepreneurial spirit of people who lived near them. Together they now form characteristic landscape features that have significant tourism value.

In all cultural landscapes, ownership plays a key role in landscape change and this has enabled a unique quality to evolve. Designed landscapes and large estates have a longevity and coherence in management and change is often slow. A large woodland, owned by a family for centuries, has been managed and cared for as a single entity over time. Childs says: "In the UK, some companies may buy up woodlands with the intention of selling them off in small portions or lots. This can potentially lead to much more rapid change. There is always the potential risk that a lack of knowledge and coherent management can alter the character of woodlands and their ability to function coherently for wildlife."

Knowing the context

Before any intervention in an area is planned and implemented, the landscape must be properly understood. Detailed evidence should be collected about the origin of the landscape and how it works. Ruth says: "Understanding a landscape from the start

provides many opportunities to integrate solutions through positive design. You don't automatically seek an engineered solution. Buildings and other new elements in the landscape, such as roads, woodland, trees can be designed to fit into existing character and be defined by their patterns. Technical interventions, such as surface water pipes or drainage channels, should only be planned as necessary additions."

Before you do that, however, it is important to invest in obtaining a thorough knowledge of the area. Childs explains: "Obtaining that knowledge is vital to protect vulnerable areas. If you don't know what you have, you can't protect it. Project developers have historically worked up ideas for new developments, first commissioning surveys covering topics such as ecology, landscape, water management and architecture later in the design process. Each of these are often done in isolation and proposals assessed post-design and determined in landscape or ecology terms by understanding effects. However, at the South Downs, new policies in the Local Plan are turning this on its head, requiring applicants to take a landscape-led approach to design. This entails asking for evidence up-front to help assess impacts of a scheme and directly inform their design. We are seeking a big change in the mindset of developers."

Climate-based adaptation and water

SCAPE focuses on climate-based adaptations with an emphasis on water systems. The pilot projects are all different, but the European Landscape Convention and Landscape Led Design

connects them. All pilot projects start by building up a thorough knowledge of the landscape. The starting point is different in each case. Middelburg focuses on water management and topography; Stene focuses on the character of the area on the outskirts of the city; while Brighton and Hove focuses on a multitude of small adjustments that will gradually restore the coherence of the landscape and provide multiple benefits.

In Great Britain, National Parks are 'protected landscapes'. In many places in Europe, National Parks are entirely state owned, while in the UK, much of the land within National Parks is owned by private landowners. Towns are also located within National Parks in the UK, such as Lewes and Petersfield in the South Downs National Park. National Parks in the UK are Government-funded and overseen by National Park Authorities who have the purpose of conserving and enhancing the natural beauty, wildlife and cultural heritage of the area, as well as promoting opportunities for the understanding and enjoyment of the special qualities of the National Park by the public. They also have a duty to seek to foster the social and economic wellbeing of the local communities within the National Park in pursuit of their purposes.

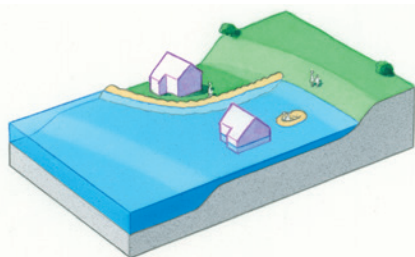
The 15 national parks in England, Wales and Scotland occupy around 7% of the surface area of Great Britain.

CONSIDERING THE SYSTEM
AS A WHOLE

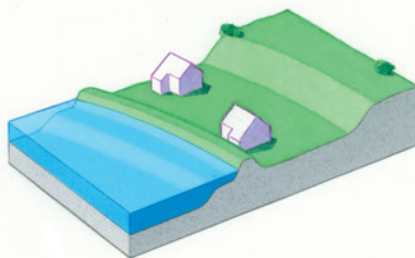
Amsterdam is not Madrid. The Northwest European delta has generated a different kind of city to that on the Spanish upland plain. And it will stay that way for many years to come, as the geology and the associated processes are constant over long periods of time. Adaptation to a new climate can fit in neatly with that.

The book 'The Rooted City' examines the development of cities in relation to the landscape within which they exist. The first cities arose in places where plentiful food could be grown in fertile land with water nearby. Then a good defensive position became more important, such as, for example, being located on a river bend or on an easily defensible hill. Later on, industry developed where key raw materials were available. The products of agriculture and industry were traded, and a strategic location along trade routes by sea, river or road became important. Through the centuries, these factors have determined the opportunities for a city to develop in a favourable landscape environment that led to growth, while an unfavourable one led to stagnation or decline.

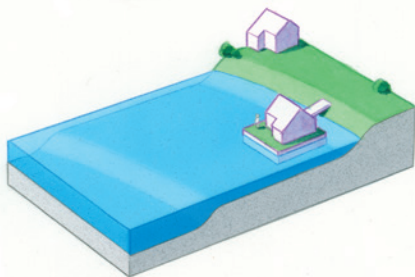
Climate change poses new challenges for cities including contributing towards reduction of CO₂ emissions and adapting to climate change. Cities have, in many ways, been working on achieving these aims for some time. The landscape in which they are situated determines the challenges they face and the opportunities available to them. Amsterdam, a city located in a river delta faces different adaptation issues than Madrid, which sits on the dry Spanish plateau. In this sense, the landscape and the location of a city matters.



Reactive adaptation
Contingency plans and sandbags



Preventative adaptation
*Reinforcing dykes, increasing
sewer capacity*



Transformative adaptation
*Reinforcing dykes, increasing
sewer capacity*

Three ways

Broadly speaking, there are three ways of adapting to climate change. These can be seen in the Figure.

Climate adaptation can be reactive. For example, an extreme weather incident triggers an immediate landscape response. Heavy rainfall quickly drains away via the sewers on to a water-course, a river and the sea. If something goes wrong insurance may help to cover the damage. In the case of a heat wave, heat survival plans are in place and emergency services are on standby. Reactive adaptation is cheap when the climate is stable and/or when extreme weather events occur occasionally.

The preventative approach goes further. Foreseeable risks are combated up to a certain level with preventative measures. When the river water rises, dykes can be reinforced. If heavier rainfall occurs more frequently, the sewers can be enlarged. These types of plans can be put in place in response to an increase in more extreme incidents to a certain extent. These plans are often sectoral and tend to focus on management and infrastructure that is designed to respond to a longer term of ten years or so.

Both reactive and preventative approaches to adaptation are reaching their limits. As a result of climate change, places are confronted with unprecedented extreme weather conditions that are more varied in nature and happen more frequently. For example, a period of extreme rainfall can be followed by weeks of drought. New solutions are emerging in response to such a wide range of complex problems. It is no longer the case that a

technical solution is immediately thought up for each individual problem but rather that the whole, integral system of city and landscape needs to be considered. Standard solutions are no longer sufficient.

In order to reduce the impact of heat waves trees are being planted between buildings to offer shade and coolness in these spaces. In a neighbourhood with small houses, planting trees can help the environment to cool down quickly at night so residents can sleep better. This is known as the transformative approach and requires a radically different approach. This is the approach favoured by, and used to inform, the development of the SCAPE pilots; i.e. to think first, then act. They are non-standard and focus on a system-based approach. Surplus water in Ostend is not discharged into the sewer but used to solve the water shortage in the Gardens of Stene. The city adapts to its basic natural system.

Netherlands 2120

Wageningen University & Research (WUR) in the Netherlands has drawn up a national climate adaptation scenario for 2120. The starting point is the basic natural system, the landscape. The geology and subsoil will remain broadly stable for the next 100 years, and the planning of cities, agriculture, roads, and water management is being adapted to it. The plan is solution-orientated, offers subject-matter for reflection, and opens eyes in an inspiring way. Climate is changing from an annoying problem into a building block for sustainable, attractive and healthy development over the next 100 years. Steps can be taken now and it will be finished in 100 years.

A NEW URBAN RIVER

Ostend is creating a new urban river. The City River is a pilot project involving a carefully designed watercourse along a street located between a new residential area and a sea-front business park.

In 2018, an unprecedented spell of extreme rainfall for Ostend caused major flooding. The damage was so extensive that the settlement of insurance claims are still to be resolved. "This was a sign that we need to start thinking about measures to prevent such events in the future," says City River project manager Kris Derveaux. A climate test was carried out to better understand the nature and extent of the problem.

Climate test

It is clear that rainfall is becoming more extreme and Ostend can no longer handle rainwater adequately as too much of its surface is increasingly paved over. But there's more to it than that. The groundwater has gradually become saltier and the salination process is continuing. Excess fresh water cannot simply be discharged into the present harbour basins given that "the city has a sensitive freshwater/saltwater ratio", explains Derveaux. "This balance can be disrupted by the supply of more fresh water and by additional algal growth that may occur like on the hulls of ships." Ostend is a key port for the fishing industry and offshore wind farms. It also has a large marina.

The challenges are complex and large in scale and creativity is needed to address these. In Ostend this takes the form of a pilot for the City River created along a street located between a



BRIGHTON

DARENT VALLEY

PORT STRAAT

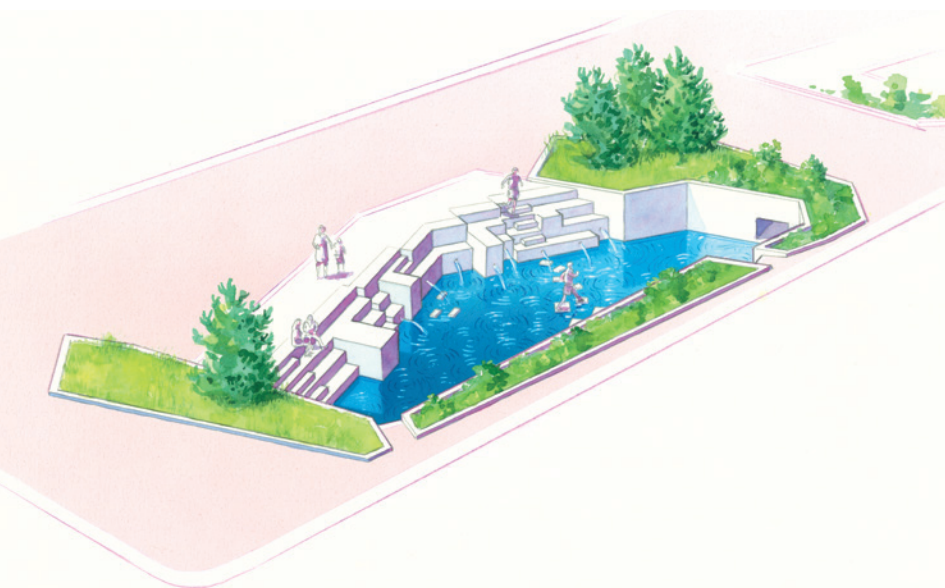
LIEFKEMORESS TRAAT

new residential area and the seafront business park. The pieces of the puzzle are falling into place with this new, man-made City River that will capture a large amount of excess rainwater above and below ground and allow it to seep slowly into the soil. Flooding is prevented as fresh water is diverted from flowing into the harbour docks and groundwater is replenished with fresh water. The contours of the river are already visible with the final works to be completed in spring 2021.

Design

The City River has all the features of an ordinary lowland river. A low, narrow bed that always carries water, a much wider bed that only carries water at high tide and everything in between. Riverbeds are always uneven and there are irregular planting beds for trees, shrubs and low-growing vegetation. They will be flooded or dry depending on the water level and the river will look completely different in wet and dry periods. The careful design is striking, including straight lines, angular bends, and planting beds. "The river runs alongside the park in the new residential area for 11,000 people," explains Derveaux. "The new district and park where the City River is located has been conceived from an architectural perspective and the design reflects that. However, the river has to deal with rainwater as a normal lowland river would: it is collected, captured and stored in the soil."

The design includes many playful elements, like stepping stones that provide natural play facilities for children and a natural purification system. The route from the city to the beach runs



through the river zone. "It is very important that climate measures are appreciated by the population," says Derveaux.

SCAPE

SCAPE has been important to the pilot project. "Initially, we didn't have much ambition at this location," says Derveaux. "There was to be a green-blue zone between the residential area and the business park, and before you know it, it becomes a green zone and a ditch. Now we've set the bar higher and come up with the City River concept. SCAPE made this possible with a financial contribution, but mainly because SCAPE enabled us to set up a sound water management system for this innovative river. That's what makes or breaks an experiment like this. Well, it's just got to work now."

The project will be closely monitored in the coming years to check if the river is doing what it should. If necessary, adjustments can be made. A 'menu' has also been drawn up for Ostend. "At the moment, we have applied the principles in a very densely populated newbuild residential area that is being built from the architectural perspective. The city council has now decided to apply this idea to other residential areas of Ostend, with each design matching the character of the district. The SCAPE pilot lays at the heart of that new policy."

SMALL SOLUTIONS TO LARGE PROBLEMS

The city of Brighton & Hove is located on England's southeast coast between the hills of the South Downs and the sea. In the last decade, the city has seen an increased frequency of extreme rainfall events and incidents of flooding from surface water that cause damage to properties. Pilot projects are underway as part of the SCAPE project to test solutions that can help to reduce the risk of flooding and improve water quality before it infiltrates into the ground.

In 2014, the city was battered by a short-lasting but intense storm that caused severe damages on some locations. In the wake of this event, the council set out to identify opportunities to develop innovative, cost-effective measures to help improve the city's resilience against climate change, in particular in regard to surface water management. The SCAPE project and its partnership approach to landscape led design to water management provided the opportunity the council was looking for. Paula Gonçalves and Alan Buck lead the team of officers responsible for delivering the SCAPE project in Brighton & Hove.

Landscape

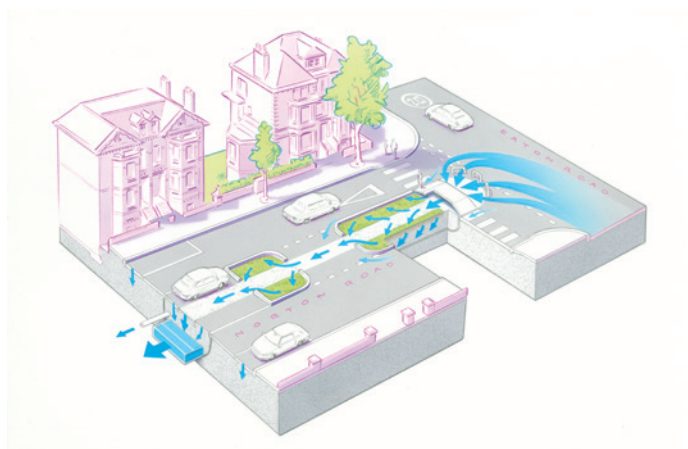
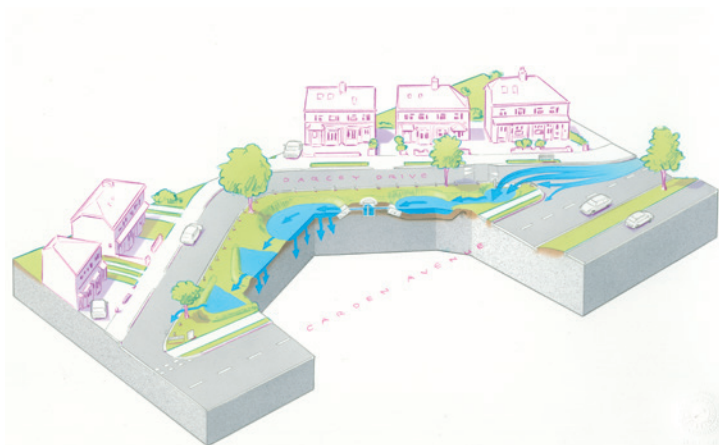
Brighton & Hove is a dense, historic, coastal city with an undulating landscape of developed dry valleys with steep slopes in Brighton and a gently sloping strip down to the sea in Hove). In this landscape, whenever the city's conventional, piped underground sewerage system becomes overwhelmed as a result of extreme rainfall, surface water runoff builds up from the higher parts of the catchment through to the lower-lying areas causing



some properties to be flooded. The drawing gives a general idea of the routes along which surface water runoff tend to flow through the city. Two areas located mid-way through two of these flow paths were selected to pilot measures that sought to divert and temporarily store surface water runoff from roads in order to reduce the risk of flooding to properties located lower down the catchment. Work to deliver the Carden Avenue pilot in Brighton and the Norton Road pilot in Hove got under way in 2017 with the involvement of SCAPE partners, local residents, businesses, water management organisations and partnerships and design experts. A competition for ideas launched in early 2017 resulted in Robert Bray Associates being commissioned to develop the design for both these pilots.

Pilot projects

The Carden Avenue pilot project is located in the upper part of a dry valley of Brighton that was developed in the 20th century. It is a low density, low rise mainly residential area of the city. Carden Avenue is a long road flanked by grass verges. Phase 1 which comprises the Darcy Drive triangle at the lower end of the pilot site has been completed. A raised table at the northern entrance to Darcy Drive from Carden Avenue has been introduced to direct surface water flow from the road into the drainage system of swales and shallow basins. The first basin contains a liner that retains pollution from the road surface. Cleaner water then flows into a second basin and infiltrates into the chalk and the aquifer below. This two-basin system is repeated in a cascade-like



manner along a sequence of verges in Phase 2 located at top end of the pilot site. The idea is to mimic natural systems in which gravity and landform are used to remove as much excess water flow as early as possible to reduce the risk of flooding to affected properties. Monitoring is expected to help assess performance of the two-basin system up to three years from Spring 2021 onwards.

The Norton Road pilot is located in the coastal Hove strip that gently slopes down towards the sea. Norton Road is a historic, tree-lined road in a mid-rise, high-density neighbourhood developed largely prior to 1914. The proposal for this pilot involves the introduction of a central surface channel in the middle of existing road reservations and car parking spaces to which surface water flowing from the upper catchment is directed to. The existing island at the top/northern end of the road is re-designed to accommodate the entrance to the surface channel. The introduction of bioretention planters at the top and bottom and permeable paving along the car parking areas of the central channel help to increase storage capacity and filter water runoff from the road before it infiltrates on to the underground storage or is directed to existing gullies towards the sea.

Goncalves and Buck also stressed the important part played by residents and local elected members in supporting project development in both pilots. They shared their knowledge about local water flows, provided photographs, video footage and feedback on performance during and after implementation. Above all, having experienced the situation firsthand, they know better

than we do from data and maps available. That have been our eyes and ears on the ground and we are grateful for their continued support for the project.'

Lessons

Goncalves and Buck observed that "with this project we are constantly learning. You want to know how much underground infrastructure is located under highway land, including verges. A lot of time went into identifying the location of services and working with Robert Bray Associates to explain the design to the utility companies and residents that had never come across sustainable drainage solutions. The residents also have conflicting interests. After all, you're introducing measures in areas that do not experience flooding and nobody likes changes taking place right next to their front yard." In Darcy Drive, they will now measure the effect of the measures. The information and learning obtained will hopefully be of benefit to future projects.

TURNING GROUNDWATER
BACK INTO FRESHWATER

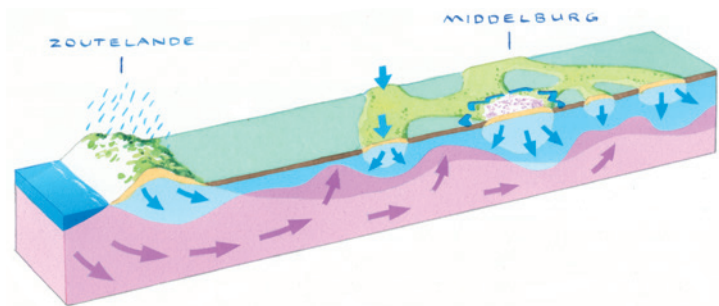
There are many places in Middelburg where you only have to dig two metres down to find brackish groundwater. It becomes increasingly salty as you go deeper. Now, measures are being taken for the first time as part of the SCAPE project to stop this.

Climate change is causing extreme rainfall events to occur more frequently, which will result in large-scale flooding and more damage. It gave Bas Kole the idea of using that rainwater: "Freshwater floats on top of saltwater, so if we get that rainwater into the ground, the groundwater becomes less salty again." He proposed it in SCAPE and was able to work on his idea in the Essenveld district that is due to be built. The district had to be built in a sustainable manner by the city council.

Landscape

A climate stress test was used to investigate how vulnerable the town is to climate change. The outcome was that drought has the potential to become a major problem. It seems a strange idea in the middle of the Dutch delta, but it has to do with how the landscape used to be.

It was once a muddy landscape at the edge of the sea: a clayey marsh containing several streams, sometimes dry, sometimes under water. When the area was reclaimed, the relief changed: the muddy clay settled, while the sandy creeks did not. Over time, the creek ridges even rose above the clay areas. They became ridges in the landscape, offering safety from high water, freshwater to drink, and fertile soil in the area. A great place for a settlement.



But Middelburg grew quickly and forgot about the landscape; the creek ridges were drained, and the freshwater drained away. New housing districts needed to be dry and that was what dykes and sewers were for. And so the groundwater became brackish.

Extreme weather

The climate is changing and the weather is becoming more extreme. Sudden, fierce downpours flood the streets, and that water needs to be removed quickly, but this can be followed shortly afterwards by a long period of drought and suddenly there is a risk of water shortage.

“From now on we have to build differently, to follow the landscape,” explains Kole. “Water features in the lowest parts of a neighbourhood and creek ridges allow rainwater to sink into them. Then we store freshwater and push the brackish groundwater back down somewhat.

A great deal of attention is being paid to water in Essenvelt, and that’s why we hired a landscape architect. We wanted a Landscape Led Design, in which you start by designing the water. Not to drain away the rainwater as quickly as possible, but to let it sink into the ground on the creek ridges and store it and allow it to be visible in attractive ways in the lower areas. We need to regain awareness of the importance of freshwater. And how beautiful it can be.”

In Essenvelt, there will soon be features to allow play with water, with water flowing through the streets and cascades. It is all included in the ‘Water Sketchbook’. The neighbourhood will

be constructed to co-exist with water (but not be too wet, obviously) and the planting will be adjusted accordingly. Each home will have its own 5,000-liter rainwater buffer. However, Essenvelt turned out not to be the best place for a Landscape Led Design. A great deal had already been decided on. Is that a shame?

Landscape Led Design is embraced

“Yes and no,” says Kole. “Yes, because we didn’t think about this from the very beginning, and no, actually it’s not that bad. In all subsequent plans, we are now looking at the underlying landscape, the soil and the subsoil. You see that there is now a high level of awareness within the organisation, the ideas have been embraced. We are working on plans to store rainwater in the creek ridge in another neighbourhood, Sint Laurens. The Environment Plan, which sets the course for the long term, is based on reducing paved surfaces and increasing the amount of green space in order to prevent drought and flooding. There are probably things that we’ll say later we could have done better, but that too is Landscape Led Design.”

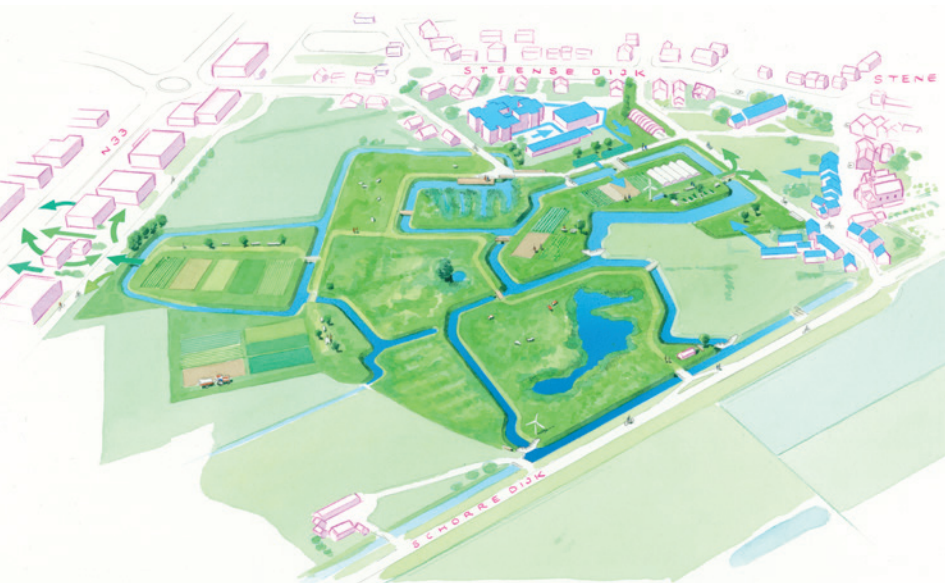
URBAN WATER FOR THE FOOD PARK

The Gardens of Stene is a new park on the outskirts of Ostend. The park is intended to supply food to the city of Ostend, while Ostend will be the park's water supplier.

Ostend, the 'king's second residence', is a green coastal city with an almost unbroken stretch of green belt on the landward side, known as the Green Ribbon. "We started thinking about what kind of green space Ostend would need this century," says landscape architect Eli Devriendt. "An urban design competition was organised for the Green Ribbon." The outcome is that Ostend needs space for nature restoration, recreation and excess rainwater, but also particularly for local food production. The Gardens of Stene, part of the Green Ribbon, is a pilot project for the new Food Park. "You grow food locally rather than flying it in from the other side of the world," Devriendt explains. "The city has, in fact, always treated agriculture poorly: there has been a veritable wall between the city and the countryside. In the Gardens of Stene, city and countryside, food production, nature and recreation are woven together in harmony."

Food Park

Close to the village of Stene is the heart of food production, the Polder garden. Numerous people are now actively involved in the management and harvesting. There is a Community Supported Agriculture project with about 300 members, while the neighbouring Sint-Andreas school partnership uses the orchard next to the school; there is also a proper outdoor classroom. A great deal of attention has been paid to the network of footpaths and

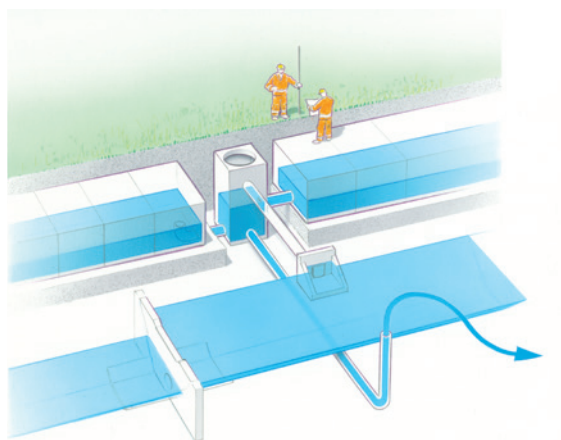
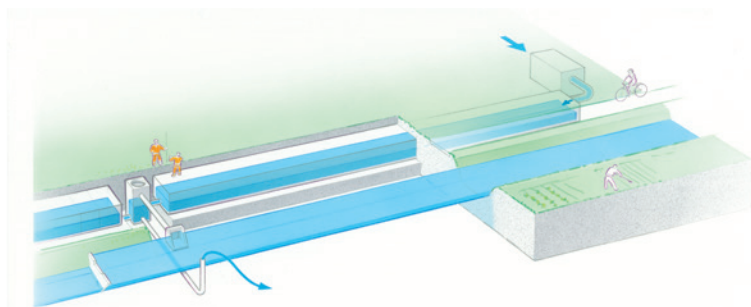


cycle paths to connect the Polder garden with the surrounding area for both residents and visitors. For example, a new cycle path will connect the school to the polder village of Stene and more new connections are still to come. The central, extensively grazed Water Meadows bring the nature of the eastern polder landscape right up to Ostend. There are meadow birds such as the northern lapwing, oystercatchers, and redshanks to be found in the area. On the western side, crops from the past and sustainable crops of the future are grown in demonstration fields, and this lies directly next to a busy shopping street. "This is an urban development task for the longer term," says Devriendt. "We want it to be a food platform, where department stores sell market products from the area and cafeterias and restaurants serve them. A genuine short chain."

Participative 'pressure-cooker' plan

How do you transform a somewhat neglected agricultural area on the edge of town into a Food Park? "We really went through a 'pressure cooker' procedure," explains Devriendt enthusiastically. "It all started when the Gardens of Stene were selected as an 'Agricultural Park' as part of the 'Productive Landscape Pilot Projects' of the Flemish Government Architect and the Flanders Research Institute for Agriculture, Fisheries and Food (ILVO). It became a pressure cooker plan: vision development, discussions with all stakeholders, design research and realisation, all at the same time."

The Gardens of Stene are a pilot within the SCAPE project. The Climate Test showed that, as a result of climate change,



Ostend will have to cope with sudden heavy rainfall more often and that the park needed extra water for food production. That turned out to be quite convenient. It was possible to modify the water system in the park to retain water. An additional dyke has been dug around the area, silted-up streams have been dredged out, the 'lanes' in the meadows have been restored, and dams have been used to raise the groundwater level throughout the area. A total of 22,000 m³ of soil was excavated.

The works within the scope of SCAPE have been completed and delivered. But a second climate test has been carried out and it turns out that these measures are still not enough. Brackish groundwater is still too close to the surface, which is not ideal for the crops in the new food production system. For this reason, additional water storage has been created, partly above and partly below ground. An agreement has been signed with the school partnership: the rainwater, which falls on the roof, is needed and will become available for the park's water system. It won't be going down the drain anymore. The water from Stene village will also eventually go to the park. The SCAPE project is finished, but Ostend continues. Devriendt: "We hope that the park works, of course."

Restrained design

Devriendt is satisfied with the project: "Landscape Led Design has brought all of the expertise to the table: the Water Board, the Polder Board, the Flanders Environment Agency, the Province of West-Flanders, the Flemish Land Agency, the city services,

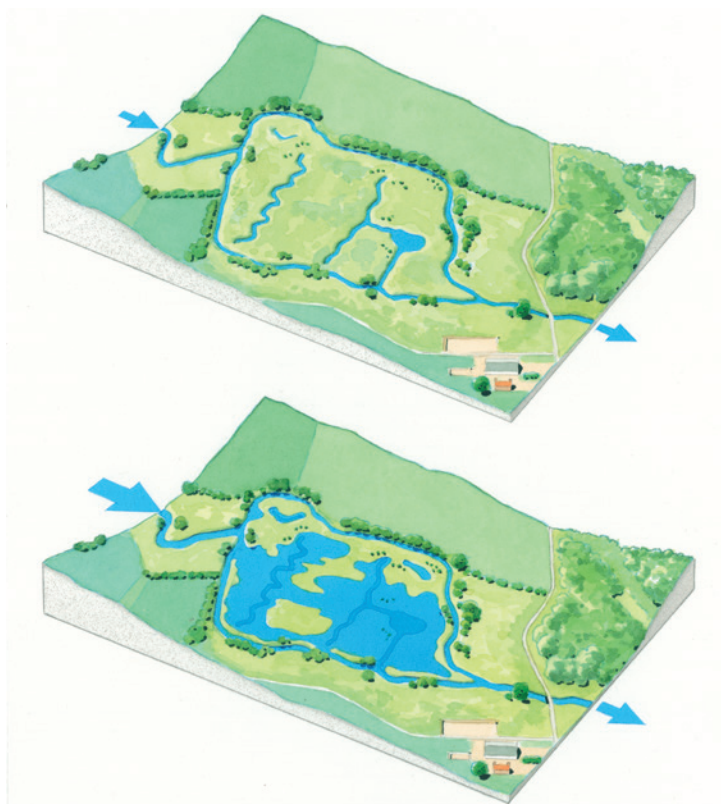
and the Department of Agriculture. Local residents, owners and users were also closely involved in drawing up the plans. We have developed the plans with restraint: the landscape has guided us, while the water plays a leading role. The wall between city and countryside has been broken down a bit.”

LANDSCAPE RESTORATION
NOT FAR FROM BIG BEN

The Darent Valley is a rural landscape that forms part of the Kent Downs Area of Outstanding Natural Beauty just outside London. Five percent of the UK's population lives within 10 miles of the valley. Conservation and management of this important area is a question of striking a fine balance between conflicting wishes and needs.

"Whilst you feel like you're deep in the British countryside, Big Ben is not far away. A total of 3.2 million people live within 10 miles, amounting to five per cent of the UK's population. The River Darent was one of the top 10 most endangered river valleys in the UK", says Rick Bayne, from the Darent Valley Landscape Partnership, which coordinates efforts to conserve and restore the landscape in the area. The area is under tremendous pressure.

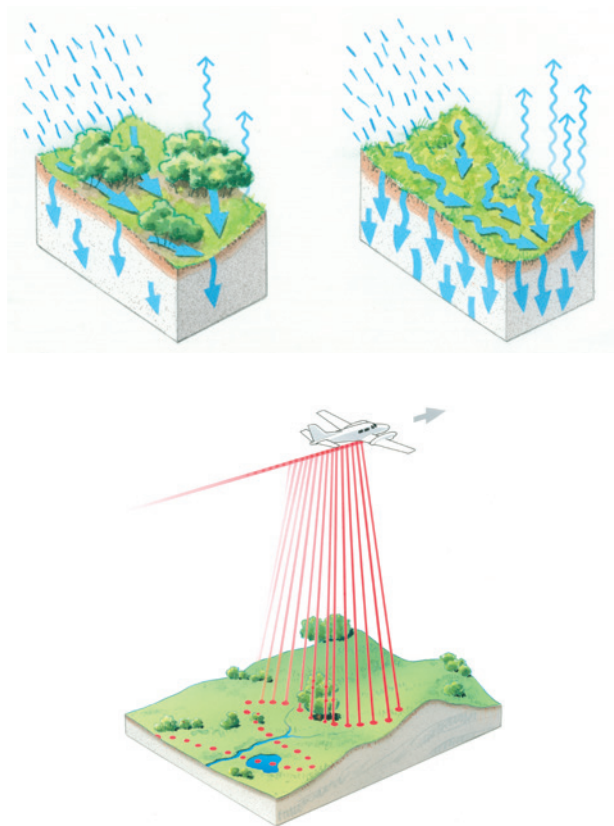
The River Darent rises in the chalky hills of the Kent Downs, but London extracts huge quantities of groundwater from the porous rocks below known as aquifers. The once flower-rich wet grasslands and water meadows have gradually lost their diversity and neighbouring chalk grassland has become overgrown with shrubs. Recreational pressure in the valley is high with large numbers of visitors from nearby urban areas; with many attracted by the four golf courses available. However, the effects of climate change are also becoming more pronounced. As Rick explains: "The river dried up regularly between the 1970s and 1990s. The number of extreme, localised rain events is also increasing. As a result, the river bursts its banks with greater frequency causing considerable damage in the prosperous villages. The cost of repair to the properties affected is considerable."



Flexible plan

Since 2012, the Darent Valley Landscape Partnership has been working to restore and conserve this unique combination of landscape, wildlife and cultural history for the long term, working in collaboration with local communities, landowners, companies and conservation organisations in the area.

The flower-rich grasslands are gradually being restored and efforts are under way to identify how to reduce the quantity of ground water being extracted for use in London. The possibility of releasing beavers into the area again is even being explored. Consultations have been held with the golf courses about water efficiency and their use of pesticides in the management of the grass. A programme has also been launched to make the residents aware of the unique character of their environment. Rick says, "We are always dependent on others, especially landowners, and that makes it tricky. When delivering projects at a landscape scale, you need the support of more than one and the greatest benefits come when people work together. If there is a plan and someone's situation changes, the landowner may need to pull out of the project and it can have a huge impact. We therefore need to be flexible and take advantage of opportunities as they arise. Wherever we can, we carry out small procedures in places where we can have the biggest possible effect." A large number of integrated projects are under way, all supporting each other to create a greater impact for the landscape.



LiDAR (Light Detection And Ranging). High-tech solutions are also being used in Dar-ent Valley. A small plane flies over the landscape in a series of straight lines, sending out numerous laser pulses and precisely measuring the time for the reflected light to return. Soil, surface water and vegetation all reflect the pulses, resulting in a precise and detailed model of the terrain and the presence of trees and shrubs. This is used to assess how the landscape influences water movement and determine what interventions are required.

SCAPE

SCAPE is bringing additional attention to a natural, as opposed to a traditional, technical approach to address the water system. Rick talks about two projects – Preston Farm and Fackenden Meadow. At Fackenden Meadow, the rich chalk grassland is being restored and the shrubby plants that threaten to take over have been removed. Strategically planted hedges help to prevent rainwater, which falls on the meadow, from running off too quickly into the river. At Preston Farm, it is exciting to see that the natural water system has returned. Old ditches have been re-excavated and small woody dams prevent rainwater from running off too quickly into the River Darent. In winter, the land is regularly flooded and Rick is content – “it’s a water meadow again”. Meanwhile, the effectiveness of the measures is being monitored. It is important to assess how quickly the rainwater is absorbed into the soil and if so, to what extent. This gives an indication as to how well the measures help to recharge the aquifers with water in order to help inform similar projects being prepared for the future.

Work in the Darent Valley will continue until 2023. SCAPE has contributed to several plans in the pipeline. Consideration is being given to whether and how the beaver can return to the Darent Valley and the river itself is also under the microscope. The intention is that the River Darent should be allowed to regain a more natural course with meanders and rapids. But the area is also of significant cultural-historical value. For example, there are 37 mills along the river and numerous, in some cases historic,

waterworks such as locks and dams. The plans must do justice to the cultural-historical value, while at the same time enabling the river to resume a more natural course. As always, it's a case of striking a new balance between seemingly contradictory requirements, using the natural landscape as a firm foundation.

AN INTERNATIONAL AIRPORT FOR BIRDS

On the coast, near the border between Belgium and the Netherlands, lies the Zwin. It is the setting for major infrastructure works, which allow nature to take its course.

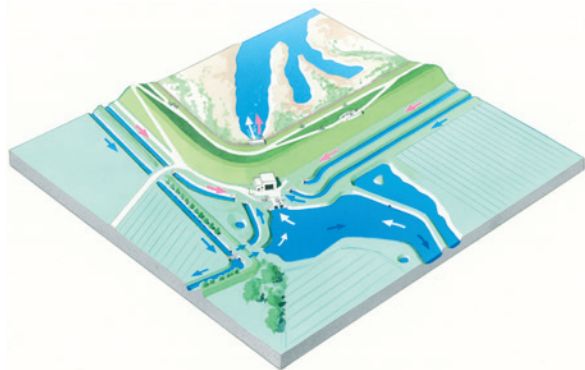
The Zwin has a long history. "It used to be a narrow inlet connecting Bruges to the sea," explains project manager Stevie Swenne. "In 1134, a dramatic storm surge enlarged the Zwin, which made Bruges accessible to sea-going vessels. They brought sheep's wool from England and Scotland. The textile industry flourished, and Bruges became a world city like Paris. You can barely imagine it now." However, the channel soon silted up and Bruges turned back into an ordinary city.

The Zwin is actually the last remnant of that sea channel; it became Belgium's first official nature reserve in 1952. Count Léon Lippens then made it his life's work. He wanted to restore the area to its past natural state, as if there had been no human influence. His dream became a reality after his death.

The task

The plans for the Zwin are based on a number of major civil engineering problems. The sea level may rise by up to a metre as a result of climate change. The dykes need to be adapted, which is a major undertaking in civil engineering. The dyke has been made larger and more complex.

The old dyke, which was too low, was demolished and a new, much higher one was constructed far inland, increasing the size of the Zwin nature reserve by 120 hectares. A great deal of soil was excavated, which has been used for the new dyke and for

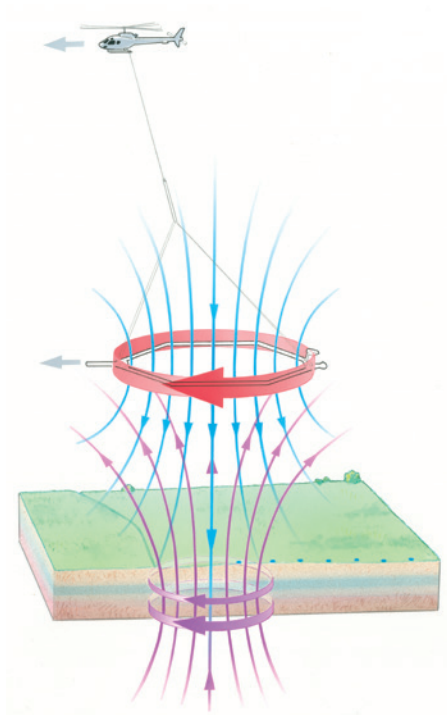


breeding islands. Some 3 million cubic metres of earth have been moved. The dyke lies 10 metres above the lowest water level and measures 50 to 70 metres wide. It can withstand an extreme storm that occurs once every 4,000 years. The estuary and channel of the inlet have been made wider and deeper. Three times as much water now flows in and out of the inlet, and the ongoing silting up of the inlet has been stopped naturally. "We also consulted with the locals," says Swenne. "Behind the dyke is rich agricultural land, which is now protected from brackish groundwater by a freshwater pond, a pumping plant, and a drainage channel."

Landscape

The project has now been completed. The new dyke is covered with scrub for the tree frog and is partly grazed by sheep. Nature in the Zwin can now continue to take its course. Approaching from the sea, you first encounter a line of dunes, with a channel running through them. Behind the dunes, you will find salt marshes and mud flats. Entire colonies of breeding birds have settled on the breeding islands. They arrive from everywhere; it is not unlike Zaventem. Large numbers of black-headed gulls, Mediterranean gulls, pied avocets, little terns and common terns live here.

Many kilometres of cycling and walking paths have been laid for human visitors, as well as ten viewing points. "A grandiose setting to move through the natural landscape," says Swenne proudly. "You see birds and flowers. You can hear the wind and smell the sea. You can feel nature on the barefoot path. And



Landscape Led Design is not only a question of nature — it uses the latest technology too. Before the project started, the salinity of the soil in the Zwin region was mapped out with an electro-magnetic survey. A helicopter flies over the terrain and sends 900 magnetic pulses per second into the ground. The strength of the magnetic signal received back tells us something about the soil's salinity. That paints a picture of the situation as it is now, and the same technique can be used to review whether that salinity is increasing.

recently this area was named by our fact-checkers as the quietest area in Flanders!”

Landscape Led

The intervention in the landscape, which is quite considerable for Flanders, follows the principles of Landscape Led Design. Four major tasks are being tackled simultaneously: the new dyke, the silting up of the channel, the expansion of the nature reserve, and counteracting the salination behind the dyke. “They have not each been dealt with by a separate organisation, as was the case in the past. All four were thought through, planned and executed simultaneously by a partnership of organisations,” notes Swenne. The project actively works with nature: stronger currents to prevent silting, soil excavated in the area for the dyke, and fresh water to displace brackish groundwater. Everything is interdependent and the technology follows the joint approach. And, after construction, nature was allowed to take its course. “It is an enormous nature project for Flanders, but we have not turned it into a large and visible prestige project,” says Swenne. “We are bioengineers, not civil engineers. It is easy for us to take nature, recreation and farmers into account. As far as we’re concerned, if you don’t see it, but it works, then that’s a good thing.”

THROUGH THE EYELASHES,
SIX TIMES
LANDSCAPE LED DESIGN

Landscape Led Design takes advantage of the landscape, letting the natural processes do their work as much as possible and adapts the functions to it. The technology supports — not the other way around. SCAPE has achieved much: unexpected inspiration, encounters and amazement.

Architectural urban planner Karel Vanackere from Ostend and civil engineer Bas Kole from Middelburg take stock together. Vanackere: “In the past, a new district was simply drawn on a blank sheet. That plan was then laid out on the site and anything that got in the way could technically be adapted to the plan. With Landscape Led Design, this is different. You look at the landscape first. How does it work? What visible and invisible elements are there?” Kole adds: “The sub-surface is much more important now. That’s what you base your plan on. Technology then serves and does not determine everything. You used to be building houses; now we’re building a neighbourhood where you can live pleasantly in a beautiful setting, with lots of greenery and water.”

The countryside: a grand gesture

The contrast between Landscape Led Design in the Zwin and the Darent Valley is significant. They are the two example projects for the rural area. In the Zwin, a major intervention is taking place in a small area: the Zwin is being greatly extended and the channel to the sea is being widened. From now on, nature will do the work; the gully will stay open by itself. Technology supports the concept. A one-off excavation was necessary; a pumping station

was also installed to protect the adjoining agricultural land from salinisation if necessary. The measures in Darent Valley are of a totally different nature. Vanackere: "That involves a lot of small, low-tech initiatives in a gigantic area, a catchment basin of several square kilometres."

Tinkering with urban rivers

The two urban projects each show a different interpretation of Landscape Led Design. In fact, two old, natural processes are being restored in an urban context. In Brighton, excess rainwater is collected in the adjacent green spaces, in a cascade system. It is passed through a filter and sinks cleanly into the ground. The City River in Ostend also ensures that rainwater infiltrates. It does not need to be discharged to the harbour and does not place a burden on the existing urban sewage system. Vanackere: "You could even say that the City River functions the way dune valleys used to. Fresh water infiltrates and replenishes the fresh groundwater bubble in the subsurface."

There has been much exchange between the two projects. And with results: in the second phase of the City River, filters are being used in line with Brighton's idea. The sleek shape of the architect-designed City River was an important inspiration for the solution to the hollow road in Hove.

Landscape restoration and urbanisation

Landscape Led Design also offers inspiration for varied and creative custom solutions in the transition between city and country.

In the case of the Gardens, the neglected landscape, situated on the edge of the city, has been restored and strengthened by means of a number of substantial interventions. The natural system has been restored. The connection with the city has been strengthened. City and country are better off. The city delivers its excess rainwater to the land; the land produces food for the city and provides space and rest for relaxation. Vanackere is enthusiastic about Essenvelt: "On the basis of the sub-surface's clear and visible landscape characteristics, the urban design was adjusted. Natural elements manifest themselves in the plan. When you're there, you can feel their presence." The old landscape returns in the new context.

New insights

Besides a lot of practical exchange, there was also plenty of room for amazement. Kole commissioned a British landscape architect to work on the plans for Essenvelt. Kole: "He told me that they deal with water in public spaces very differently in England than they do here in the Netherlands and Flanders. If you make a water feature there, there has to be a fence around it, 'otherwise those kids could drown'. Here, we take a more relaxed approach to that. There's just a ditch along the road, or a pond in the park. According to that landscape architect, proposing something like that in England would put the whole neighbourhood in a dither." Vanackere: "Something similar is happening with the City River. This was deliberately made shallow so that children can play in it safely. But because the children 'might get a bacteriological

infection', a filter system had to be installed." With a twinkle in his eye he adds: "We used to play along the canal. And there certainly wasn't a filter on it."

It's the landscape, stupid!

Where the foreword ends, the epilogue picks up! This publication is all about the landscape, you will have noticed. The central question within the SCAPE project is how the landscape can be the guiding principle when we redesign it for climate adaptation. How do we make our rural or urban landscapes better adapted to heavy rain or long periods of drought? Which interventions produce the best results? With 8 partners and 6 pilot projects, we have tested and implemented this extensively. But it is about more than just infrastructural and scenic adjustments. All the pilot projects within SCAPE have substantial positive side effects on other domains, not in the least on the liveability of the city in a broad sense. They contribute to opportunities for recreation, the cultivation of local vegetables, a landscape with greater biodiversity or a residential environment with a reduced risk of water damage. That is precisely why we value such projects and seek to disseminate and publicise what we learned. That is essentially what we are attempting to do with this booklet.

The Interreg Two Seas project SCAPE completes some important achievements in our city and our partner cities. This project was a lever for taking a new look at the landscape as a guiding principle. If we are to tackle climate change, we must apply new methods and adopt a multi-disciplinary approach. The added value of a cross-border project such as SCAPE, in which we spent several years focusing on an updated methodology, can hardly be overestimated. This is a new beginning, as well as an end. The time has come for Landscape Led Design principles to seep into our daily practices.

We hope this booklet helps you to discover what we have learned and achieved, and where. We will also be glad to show you the achievements on location, so get your walking shoes out to be welcomed for a visit.

Bart Tommelein

Mayor of Ostend



Colophon

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Landscape Led Design

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