

Landscaping expertise
AND NATURE-BASED SOLUTIONS



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About *idverde*

As the climate crisis deepens, and the UN and The World Economic Forum are calling for climate change and the loss of biodiversity to be solved together, *idverde* is responding with a comprehensive portfolio of landscaping and ecological services to fit the unique needs of nature and people, in rural and urban areas, everywhere.

As experts in nature-based solutions, we put people, planet and performance at the heart of everything we do. We have over 10,000 employees across 150 branches in six countries who are experts in climate adaption, biodiversity, arboriculture, soil quality and water management. It is through our people and our comprehensive portfolio of landscaping and ecological services that we are able to manage complex projects and respond to each project's unique challenges.

As Europe's leading landscaping creation and maintenance company, over 10,000 customers in both the public and private sectors, including large blue-chip organisations, have developed long-standing relationships with us, relying on *idverde* to bring the power of nature to their projects and community spaces.

Join us now as we showcase some examples of our knowledge, quality solutions and innovative thinking.

idverde



SHARING KNOWLEDGE

Sharing knowledge

Our knowledge is built on more than 30 years of experience in both urban and rural landscapes. Across Europe we have first-hand knowledge of today's challenges, from water stress to rising temperatures, from the effects of pollution to wildlife protection. And through important partnerships such as our 5-year relationship with the RSPB in the UK, we ensure our knowledge, skills and solutions are always developing.

That's why we can offer a holistic range of services which balance the needs of people and planet:

**LANDSCAPE CREATION,
CONSTRUCTION, MAINTENANCE
AND ADVISORY SERVICES.**

Sustainability strategy



PEOPLE

FOSTER WELL-BEING THROUGH A LOCAL & INCLUSIVE SOCIETY MODEL



1 | DEVELOP EMPLOYEE SKILLS AND WELL-BEING TO CREATE A GREAT WORKPLACE
Increase the employee engagement rate each year, in each country, to reach 85% group-wide



2 | CREATE PARTNERSHIPS WITH LOCAL COMMUNITIES
Establish at least one long-term community partnership in every operational location



3 | DEVELOP LOCAL EMPLOYABILITY
Increase by 5% the number of colleague opportunities for people who are far from the job market

PLANET

DEMONSTRATE OUR ENVIRONMENTAL LEADERSHIP



4 | IMPROVE OUR CARBON FOOTPRINT
Reach carbon neutrality on direct emissions whilst improving our carbon intensity by 5% each year



5 | IMPROVE WASTE AND RESOURCE MANAGEMENT
Recover 100% of our green waste, recover 80% of other waste and maximise the circular economy approach to material sourcing



6 | PROTECT, ENHANCE AND RESTORE BIODIVERSITY
Increase by 10% every year the number of our activities with a positive impact on biodiversity

PERFORMANCE

RAISE AWARENESS & SUPPORT INNOVATION TO ADDRESS SUSTAINABILITY CHALLENGES



7 | SENSITISE IDVERDE AND ITS KEY STAKEHOLDERS TO THE CLIMATE EMERGENCY AND BIODIVERSITY CRISIS
Train, educate and inform 100% of employees & engage our key stakeholders



8 | DELIVER EXPERT AND OPERATIONAL SUSTAINABLE SOLUTIONS FOR OUR CLIENTS
Systematically identify scope for sustainable improvement with our customers



9 | INNOVATE TO SERVE THE ENVIRONMENT
Each year, recognise and reward the most positive outcomes of our projects and activities



10 | ACHIEVE B CORP CERTIFICATION
Certify all idverde entities by 2024



B Corp and ISO certification

We are on our way to becoming EU's first B Corp-certified landscaper. B Corp is a recognized international sustainability certification that assesses a company's entire operation. It is a hallmark of our efforts and a guarantee that we always provide the best solutions. B Corp also signals going beyond standard legal procedures. We go from compliance to commitment. This is necessary if we want a better future for nature, the environment and our society.

idverde works with high standards and our ISO certifications 45001 in Work Environment as well as 14001 Environment ensures this as well as our sustainability roadmap. Sustainability is not only something we strive for – it is something we do.

LEADING EXPERTS



Large network and shared knowledge

With 10,000 employees across Europe, we have inhouse expert knowledge on topics such as biodiversity, climate adaptation, arboriculture, soil quality and irrigation techniques in a context of water scarcity. We can calculate the carbon removal and value of CO₂ stored in trees, and advise on how to increase it over time.

Our experts also help customers measure and increase soil carbon, which enhances fertility in addition to the other ecological benefits.

Our experience covers a very broad range of northern and southern geographies and climates.

We have specialists in climate adaptation and water management

Given the increasing impact extreme weather events, our climate adaptation experts are aware of the important role they play in securing and future-proofing communities and nature. *idverde* delivers relevant advice on how to use and shape the landscape to reduce climate risk and how to preserve water.

Biodiversity specialists in the field

Each branch in *idverde* has biodiversity experts who work on initiatives to monitor, preserve and regenerate biodiversity, both in ongoing and new projects. We can carry out surveys, apply relevant biodiversity indicators, help our clients obtain certifications and can deliver 'biodiversity net gain' on a large variety of habitats.

Specialists in trees and arboriculture

We are specialists in trees and arboriculture, and we offer services such as advice, diagnosis of disease, tree care and maintenance. Our experts work closely with various scientific institutes at home and abroad. We use consultations, diagnoses, laboratory analyses and the latest methods and technologies.

Knowledge is power

We prioritise new knowledge and keep our employees constantly updated through training and education. We have established our own academy, where we collaborate with the best educational institutions and universities.

As part of our focus on improving our business, we have created a cross-European Research & Development function, where we come up with new, innovative ways to create sustainable landscapes.

Examples of idverde's educational courses and training:

- Apprentice and mentor schemes
- Climate adaptation
- Biodiversity
- Certified rainwater consultant
- Team leadership training
- Arcadia Academy
- Talent development
- Climate awareness workshop



INTELLIGENT SOLUTIONS



All information at your fingertips

Intelligent, wireless solutions make cities and parks more efficient, resilient and sustainable. With the use of IoT and geographic information systems (GIS), idverde translates information into insight, making it easy to make well-considered choices for a sustainable natural environment.

Drones and GIS are used for both planning and carrying out projects, e.g. with drone aerial imagery and image recognition to monitor the vegetation and trees, measure and manage the development of an area devoted to biodiversity or CO₂ sequestration.

Using sensors, we can monitor the health of plants, trees, roots and water flow. Root and water monitoring systems as well as slow-release watering bags optimise water use and help grow tree resilience in areas with scarce freshwater resources. Our care for plants and trees does not stop after planting. Sustainability means taking care for the longevity of our landscapes and services.

We use sensors to register the flow of people visiting park areas, while also monitoring the amount of waste in bins and containers to ensure they are emptied before flowing over.

Sensors also enable us to monitor the utilisation of our hand tools and their CO₂-emission.

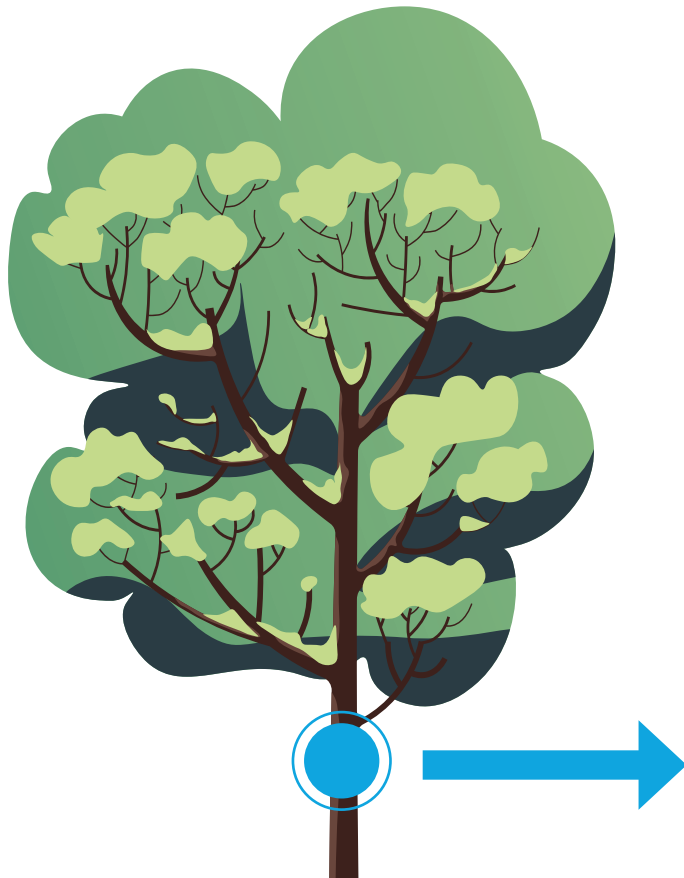
All the used technologies are accessible 'on the go' via online platforms to ensure quick and efficient quality assurance and follow up.

Predictive management improves productivity and improve wellbeing

We use intelligent systems that can communicate with each other, to optimise processes and tasks or plan areas and infrastructure, with fast access via smartphones, tablets or computers.

Collecting precise data from different areas gives us the ability to measure moisture in soil, among others, to ensure optimal watering of plants and trees and minimise the risk of drought damage.

Switching to predictive management of green spaces also helps to increase productivity in operations and makes plants more resilient to climate events, thereby improving the wellbeing of our citizens.



IoT sensors help collect the following data on site:

- Ecological benefits
- Structural analysis
- Economic value
- Metric information
- Health status and state
- CO₂ sequestration

IoT and intelligent systems



Construction drawings as 3D models

- Getting a better understanding of the project and finding potential blind spots.
- Excellent documentation of the work done and materials used. Complete transparency.

Benefits:

- Automated documentation.
- Cost savings through reduction on human capital.

INTELLIGENT SOLUTIONS



Drones provide data in hard-to-access areas

By using drones, we have access to areas that are usually difficult to reach for humans and large machinery. Drones help, e.g., with sowing plants and can be used for local pest control. Furthermore, they offer aerial imagery and image recognition, where the data provided makes it easy to monitor the development of the area, e.g., identify selected indicator plants.

Our **intelligent solutions** help our customers make **smarter decisions** based on better information using the **latest technology**

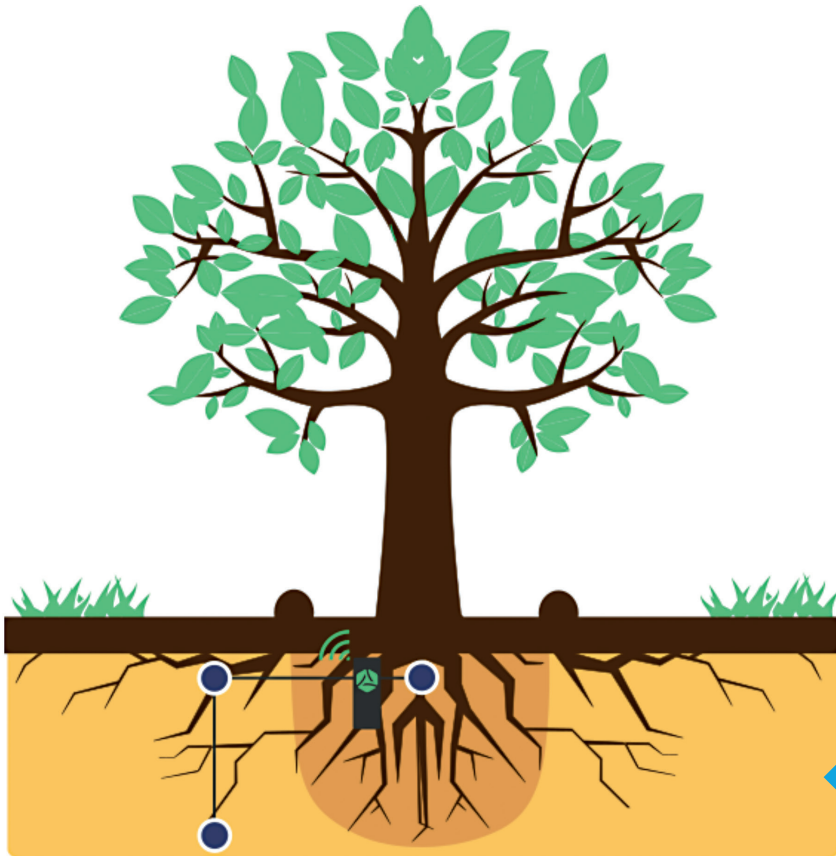
Solar power, electricity and biodiesel

We are working purposefully on converting hand tools and our car fleet to electricity, installing solar panels on cars to power the electrical tools as well as increasing the use of biodiesel in heavy machinery.



Data help boost tree growth

idverde provide the data and platform to map, monitor and optimise forests. By monitoring the trees we have the ability to see soil conditions and irrigation needs. We have access to a wide variety of data, which also tells us about the state of the trees' root system. That allows us to intervene and employ measures to boost the health of the tree if needed. These measures increase growth from 15% - 90%.



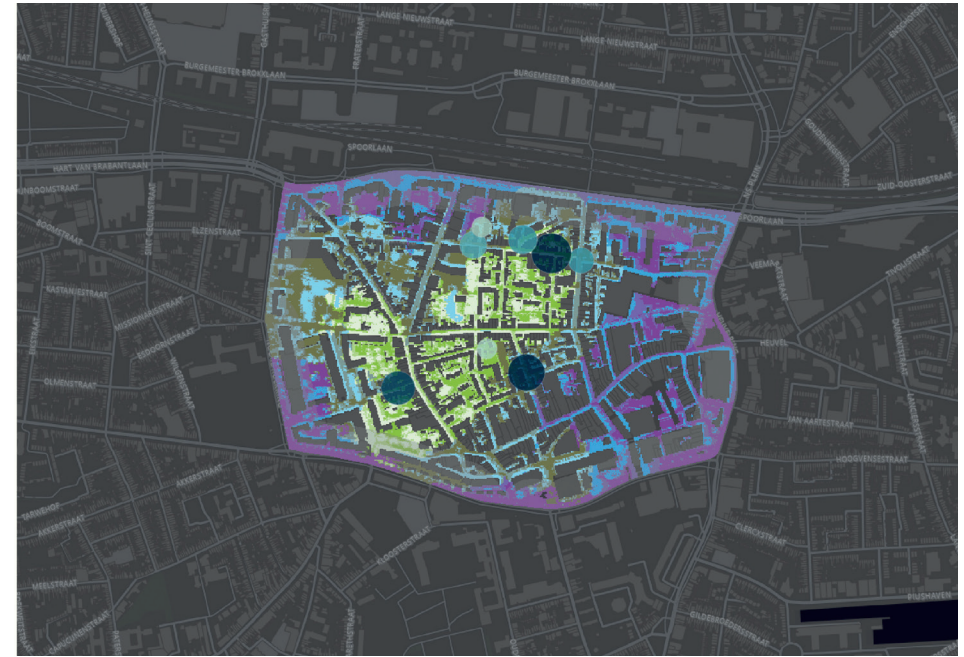


Tilburg City Center – ArcGIS shows which streets need more 'green'

The municipality of Tilburg has decided to make 40 streets in the city center greener to mitigate the increasingly serious consequences of climate change. With students from the HAS University of Applied Sciences in Tilburg we have mapped out where planting extra trees and plants will have the largest impact on reducing heat stress and increased biodiversity using the geographic information system ArcGIS.

“When the map turns purple, that’s where the problem is greatest”, says Dennis van Heumen, project leader at idverde Advies in the Netherlands. “This shows that the edges of the city center and the south-eastern part score poorly and is in need of more ‘green’”.

All 40 green streets will be completed by 2023. Based on the map we will work on increasing plant areas, creating additional facade gardens, planting new trees, improving growing areas for existing trees and other green options. With the use of ArcGIS and other digital tools, we are able to create visualizations of a significantly greener Tilburg. More greenery e.g. trees, shrubs and plants will contribute to cooling down the city center through shade and evapotranspiration as well as reduce the risk of flooding, increase biodiversity and make the city more ‘livable’ for people.



TREES



Trees and arboriculture

Trees are vital for future green cities. Numerous studies have demonstrated that the presence of trees and urban green spaces can improve our quality of life, improve the property values in a neighbourhood and provide a range of ecosystem services.

With the consequences of climate change becoming more and more visible, trees are a key component in our efforts to mitigate these consequences. Metropolitan areas are significantly warmer than their surrounding rural areas due to human activities and a low land-to-building ratio. This is called the urban heat island effect. Large trees create shadow and help cool down urban areas, while we also use our expertise to plant trees in a way that guides a cooling wind to the warmest areas. Trees are furthermore extremely effective in capturing CO₂ and other pollutants.

idverde can calculate the CO₂ capture and storage for each tree depending on its species and growth, thanks to an elaborate software we are constantly updating.

When striving to create value for people, communities and the environment, mature trees add more value than young trees. We take pride in maintaining our expertise in tree care as well as transplanting mature trees to new locations.

**Plant vitality average in Europe is 70%
– in *idverde* it is 95%**

The analysis of the soil on site is essential to understand how the quality can be enhanced.

Knowing the values of the existing soil will make sure the soil mixed reaches the most optimal product. It can save a lot of money and time when the mixing is done correctly based on analysis and knowledge.

Transplantation of trees

Sometimes mature trees can be affected by construction projects. Perhaps a specific landscaping project needs larger trees to complete a certain look, or there is a desire to quickly gain the natural benefits of mature trees over seedlings.

Cutting down trees is not only destroying years of growth and labor but is also compromising the natural benefits that larger trees provide, such as preventing soil erosion, protecting buildings from wind and summer heat, protecting against flooding and making a landscape attractive and valuable.

We are able to transplant mature trees to other sites within the territory or take them to a temporary holding nursery and later return them to the final position within the project site. This way, we help preserve the urban green heritage and maintain the economic and environmental value of mature trees.



Benefits of transplanting over planting

- Mature trees capture large amounts of rainfall per year, reducing runoff and filtering water.
- They cool the cities and help to improve the climate and bring down the Urban Heat Island effect.
- It is proposed that one large tree can provide a day's supply of oxygen for up to four people.
- In one year a mature tree will absorb more than 48 pounds of CO₂ from the atmosphere and release oxygen in exchange.
- Big trees provide food and shelter for wildlife and make a landscape attractive and valuable.



TREES



The Port of Rotterdam – Sensors and HVO

idverde manages the green spaces of the Port of Rotterdam, which are among the largest in the world covering more than 10,500 hectares and stretching across 55km. *idverde* uses sensors to measure the moisture content of plants and trees in real-time. If a tree is close to reaching the critical moisture content, an alarm is set off.

Moreover, *idverde* has dramatically reduced its CO₂ footprint by converting diesel equipment to sustainable alternatives such as GoodFuels HVO100 or electric machinery, saving approx. 736,500kg of CO₂ per year.

Tree monitoring and optimisation of maintenance

With the use of IoT, drones and sensors, we can monitor and optimise our maintenance on trees, shrubs and plants. We use drones in various projects to take photos and keep exact coordinates of all trees in an area, or as a guiding tool in our recommendations for where to plant new trees.

When we plant new trees, we plant them with individual sensors that e.g., measure moisture content in the soil. We use the data to optimise our maintenance ensuring that we only water and care for trees that need it. This minimises the risk of sustained damage from drought, while saving freshwater resources as well as CO₂ in the form of less fuel for transportation to and from site.

By acting on real-time data from the actual conditions on site, we can significantly reduce the mortality in newly planted trees and shrubs, ensuring a 95% survival rate.



Smarter management

idverde is providing deep-rooted knowledge and tree inventory to the project sites.

Using smart tools based on AI, we enable project managers and policy makers to plan and manage trees smarter. AI data analysis helps find the best planting location, choose the right species and prepare for planting for an optimal impact.



Frederiksborg Castle – Pruning and care



The famous and eye-catching Baroque Garden at Frederiksborg Castle was first established by King Frederik IV in the 1720s.

The garden is laid out in four terraces, which are level with the Castle Lake. On the lower terrace more than 65,000 boxwood plants are used to make the four royal monograms – one for each of the regents who have played a role in the history of the garden: King Frederik IV, Christian VI, Frederik V and Queen Margrethe II.

For almost a decade we have maintained the castle grounds in collaboration with local gardeners, making sure that the strict lines and ruler-straight hedges, the finely cut grass slopes and the trimmed boxwood trees display what the historic Baroque Garden looked like in the 18th century.

Nothing is left to chance on this special assignment, which requires many different skillsets in gardening art and traditional green care.

Tree care and pruning

With the help of our tree arborists, we prune trees of all sorts. Some trees are pruned for safety reasons, while others are pruned due to health concerns, aesthetics or function. There are many benefits to having large and old trees as they capture CO₂ and can be used to cool down an area, but pruning can be necessary to gain enough sunlight to maintain the ecosystems and habitats that exist on the site.



The SNCF trainline – Safty and access

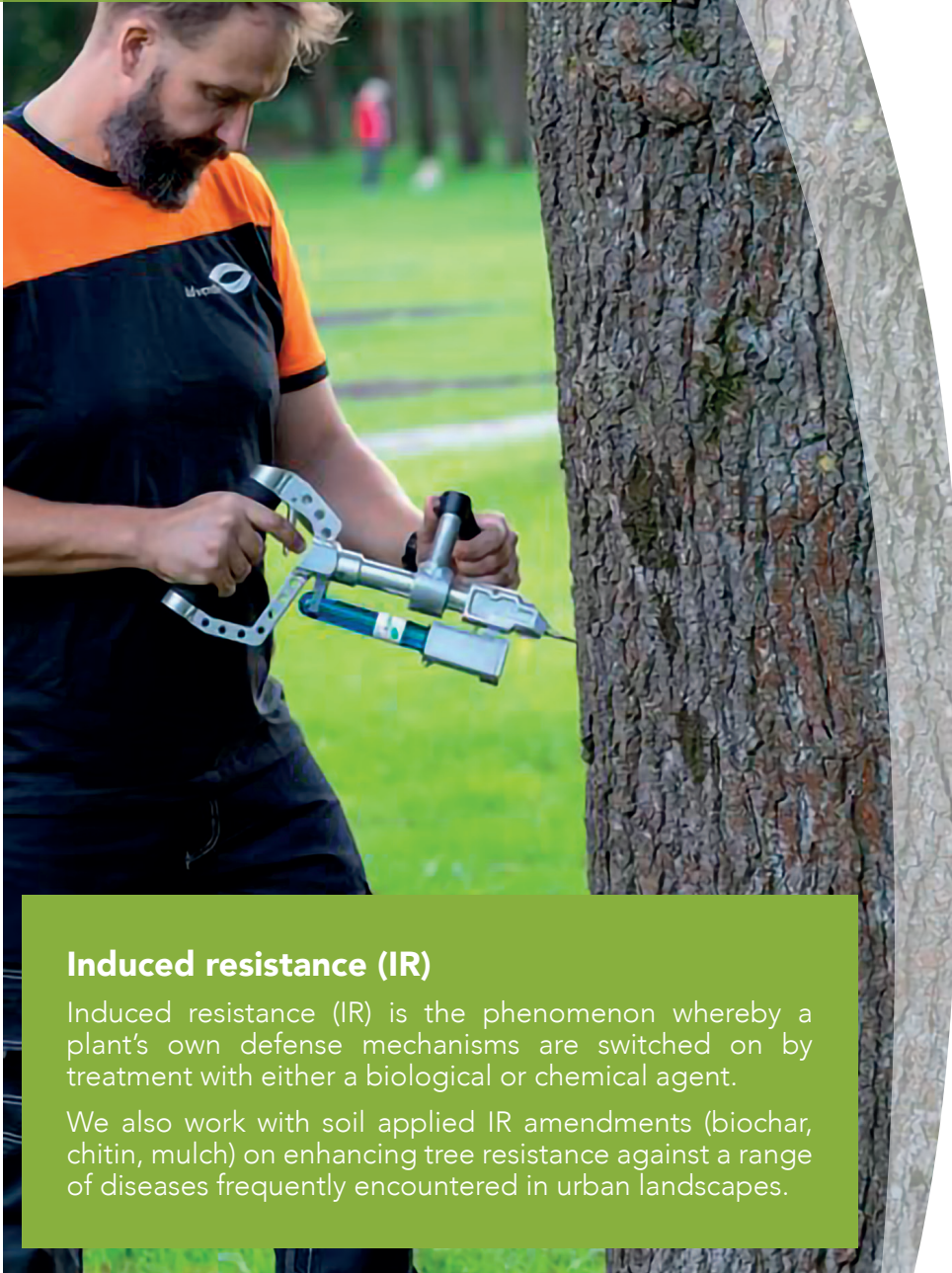
With increasingly frequent and devastating forest fires such as those experienced in Europe in the summer of 2022, there is an increasing awareness of the importance to maintain the safety of electric power lines and infrastructure.

idverde ensure safe and functional train operations for 700 km of the SNCF trainline.

Energy supply and transport corridors are crucial in the modern society. To ensure supply in high-voltage cables, power lines for, e.g., train traffic, we have the expertise to prune trees along high voltage lines without damaging the supply lines.

Along roads and railways the safety of road users must be paramount. Here it is also necessary to have the right equipment and expertise.

TREES



The Hague – Elm tree vaccination

The Hague has approximately 16,000 elm trees along its streets and roads. If an elm tree is infected with Dutch Elm Disease (DED), the disease can quickly spread to the surrounding elm trees through the roots or the infectious beetle itself. For this reason, the elm trees are inspected twice a year between May and September. This includes both the municipality's own elm trees as well as elm trees on private properties. Approximately half of the elm trees in Hague receive the DutchTrig® vaccine. The other half are newer elm species, which are naturally resistant to DED and therefore do not require the vaccine.

Injecting the trees has improved the survival rate as only a few dozens of trees die each year as opposed to the 1,500 to 2,000 elm trees that died from the disease 20 years ago. The trees need to be vaccinated early in the growing season, when the elms begin to bud. The weather also has to be good. The bark should be dry so that the tree absorbs the vaccine.

We can apply the DutchTrig® vaccine worldwide – we already apply the vaccine in the USA, the Netherlands, Canada, United Kingdom, Germany, Sweden and Norway.



Induced resistance (IR)

Induced resistance (IR) is the phenomenon whereby a plant's own defense mechanisms are switched on by treatment with either a biological or chemical agent.

We also work with soil applied IR amendments (biochar, chitin, mulch) on enhancing tree resistance against a range of diseases frequently encountered in urban landscapes.

21,197
elms vaccinated*

98.8 %
treated elms survived*

€920,400,00 saved
More trees stay healthy
and don't have to be replaced*

1,258,946 kg CO₂
Sequestered annually by saved
elms in the Netherlands*

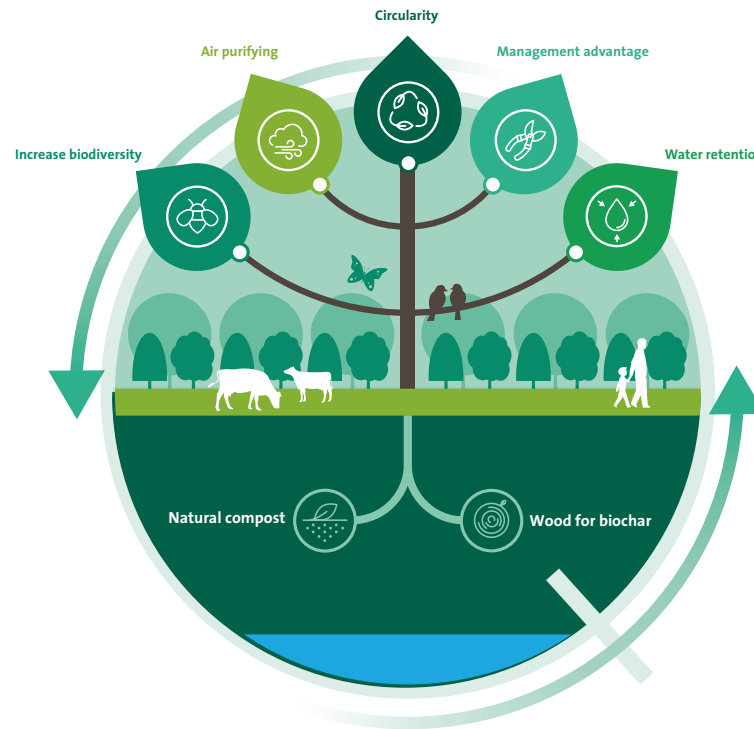
*Source: DutchTrig® Factsheet 2020

CirQleaves and biochar

CirQleaves is our circular plant concept that maximises CO₂ capture, improves soil quality, reduces the need for watering and has a positive impact on biodiversity.

When planting trees and bushes in areas with poor soil conditions, we use a combination of biochar and natural compost produced from green waste from our maintenance (leaves, grass and wood). Biochar has a high carbon content (60 to 90%) and is a carrier of nutrients and minerals in the soil. The combination of these two products improves soil fertility, water management and root germination significantly. At the same time, it increases the soil's ability to capture particulate matter, nitrogen and CO₂ from the atmosphere.

With each percent of natural compost added to the soil, the water retention capacity of the soil increases 2-3 times. By adding a mere 1.5 centimeter of biochar to the soil, the water retention capacity is increased by 50 percent compared to regular soil.



The diversity of vegetation forms a suitable habitats for many species of insects, birds and mammals.



Woody plants can capture up to ten times as much CO₂ as herbaceous plants and grasses.



We process the wood and leaves into biochar and natural compost.



We manage the tree for at least six years after planting. After this period, we can extend the management contract.



Adding 1.5 cm of biochar to the soil results in a 50 % greater water-retaining capacity of the soil compared to regular soil.



Re-vitalise the soil with Airgrow

We can revitalise the soil with Airgrow, a method where air is pumped into the soil. When adding air, the soil becomes more porous, resulting in better growth conditions and increased water retention capacity.

The limitations in the growing location can have various causes, such as: compaction (due to work), other intensive use of the location, problems with hardening, water infiltration or lack of oxygen or nutrients. As a result, shortfalls in growth conditions can arise. To give the trees a boost, the Airgrow method is a relatively cheap alternative to extensive soil exchange.

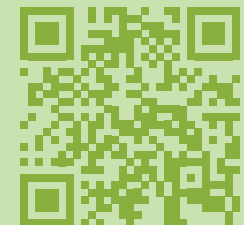
The Airgrow aeration machine tears the soil open with air pressure. This air pressure creates underground channels, allowing more oxygen to reach the roots. Subsequently, various solid or liquid fertilizers can be introduced into these air ducts re-vitalising the soil.

When there is a shortage of nutrition in the soil, the Airgrow aeration machine can also remove pillars of the existing (depleted) soil at various points, without causing significant root damage. Following this, the soil pillars are replaced by a humus-rich mixture adding nutrients to the tree.

Watch a video of the Airgrow method

Watch the Airgrow machine at work at the historical Oostsingel in Delft, NL.

The video is published in 2022.



GREEN ROOFS AND WALLS



Benefits of green roofs and walls

Bringing nature into our cities is a vital component for a more sustainable future. Green infrastructure such as green roofs, green walls and pocket parks not only mitigates the consequences of climate change, but also contributes to environmental, social and economic benefits for cities and the people who live there.

Nearby access to green urban spaces is a key ingredient in ensuring well-being and mental health, while also promoting urban 'livability' and adding to the community's bottom line. With cities growing ever larger to meet the need of more housing, vertical and horizontal green infrastructure on walls and rooftops is easily integrated with limited space.

The benefits of creating green walls and roofs are multifold. For example, they improve stormwater management and air quality, improve biodiversity, reduce urban temperatures and 'heat island effects', capture CO₂, reduce noise, insulate the building and thereby lowering heating costs, while also contributing to greater income potential and meeting planning requirements.



Education and shared knowledge

Green walls and roofs require regular expert maintenance. With our training programmes employees can become specialists in the field of e.g. gardening and climate adaptation, biodiversity or as a certified rainwater consultant. When we educate new landscape gardeners they learn how to create green walls as part of the curriculum.



Photocredit: Kragh Berglund



BaseCamp – Co-living with nature

BaseCamp Lyngby is a community-oriented building designed as a superstructure with sustainability and co-living at the forefront. The building embraces the cohabitation of researchers, expats and citizens across different age groups, functions and nationalities, which creates a very special dynamic among the residents.

The project is inspired by the surrounding environment with the desire to bring people closer to nature and each other.

It is an installation created on the roof of the building, which consists of an organic meandering path that has a park-like and lush character with scattered trees and a large variety of areas with grass and perennials.

Cooling, depollution and energy consumption

A considerable number of scientific studies on ecosystem services delivered by green roofs have appeared over the last few decades.

17 studies reported cooling at street level ranging from 0.03–3 C°

4 reported pollution removal at roof level e.g. removal of small particles PM10, ranging from 0.42–9.1 g/m² per year,

20 reported building energy consumption with changes in the annual consumption ranging from an increase of 7% to a 90% decrease.

GREEN ROOFS AND WALLS



Het Platform in Utrecht – A green MicroCity

Het Platform in Utrecht, designed by VenhoevenCS architecture+urbanism, is a MicroCity with 200 apartments and public facilities such as a gym and a restaurant. The building is widely recognised for its beautiful rooftop and it is built on top of the tram station Uithoflijn. The challenges with rooftop gardens are to ensure that the weight is kept at a minimum, while creating sufficient growth conditions for plants and trees.

idverde has turned Het Platform into a natural landscape within the city. Instead of creating 200 small private outdoor spaces for each of the apartments, the MicroCity consists of several large green areas with green terraces as well as rooftop gardens that residents share with one another. The green areas are also open for the public.

With a variety of plants and trees, the roof offers space for several functions, e.g., recreative purposes, water retention as well as increasing biodiversity, cooling the area and improving air quality.

At this scale, Het Platform is probably the first “nature-inclusive residential building” in the Netherlands.

WINNER OF THE ROOF OF THE YEAR 2019

Awarded by dutch magazine Roofs

Green walls has high energy potential

The use of green walls as energy extractor for heat exchangers is not that common yet. But recent studies show that green walls can handle large amounts of rainwater while extracting energy. The first calculations show that the energy potential for vertical green walls is 10x the potential for ordinary geothermal heating pipes.



CopenHill – Turning waste management green

CopenHill is a 85 meters tall waste-to-energy plant with a 16,000 square metre green roof that works as a publicly accessible recreative area, where visitors are also able to glimpse inside the 24-hour operations of a waste incinerator.

It is an innovative notion to create a mountain landscape on a roof and the project won the World Building of the Year Award at the World Architecture Festival in 2021.

The landscape is designed as alpine meadow, but strong wind conditions made it necessary to use shear barriers to prevent the materials from eroding, while also using pre-grown vegetation mats to secure the soil in the steepest areas and plant trees with reinforcing mesh to place them vertically on the inclined surface.

The project furthermore addresses the role of architecture in the new world of recycling and zero carbon emission.

The urban heat island effect

Green roofs and walls are cooling the cities and reducing the effect of 'heat islands' (urbanised areas that experience higher temperatures than the outlying rural areas).

Buildings, roads and other infrastructure absorb and re-emit the sun's heat more than natural landscapes such as forests and waterbodies. Urban areas, where greenery is limited, become 'islands' of high temperatures.

WINNER OF THE WORLD BUILDING OF THE YEAR 2021

Announced at the annual World Architecture Festival (WAF)



Photocredit: Enhorn Hummerston

BLUE GREEN SOLUTIONS

Nature-based climate adaptation

Climate change is here. Beyond doing everything we can to cut emissions and slow the pace of global warming, we must adapt our communities and cities according to the consequences of climate change.

According to the Fifth Assessment Report from the IPCC, we can expect even more frequent and more extreme weather events in the years to come. Finding new and innovative solutions to managing rainwater is therefore crucial to help urban areas adapt to climate change.

At idverde we work with the purpose of helping nature

in rebuilding its own resilience against climate change. We are creating nature-based solutions that help protect communities against climate changes. We are preparing for and adjusting to the expected effects, while at the same time protecting nature by offering solutions that e.g., enhance and protect biodiversity and existing habitats.

None of our solutions are the same as we examine and assess the individual area to create a nature-based solution that matches the soil, water flow and greenery on the site. Should we e.g., retain, delay or divert the

water flow? If there is too much water, we can use permeable coating and trees as absorption, while we can create solutions with plants that have a high tolerance for drought and collect surface water for reuse.

When we create and maintain landscapes, we work intelligently in a data-based way and with the full water cycle in mind. By combining nature-based climate adaptation and biodiversity, we can create durable and reliable nature-based solutions for the benefit of cities, the people who live there and flora and fauna.





Aménagement du Chemin des Mérinos – Urban drainage

As the climate changes and the frequency of extreme weather events increase, so does the need for intelligent rainwater management solutions. Handling rainwater is an increasingly urgent challenge for larger cities including Chemin des Mérinos, which is an urban area in Lancy that is a part of the municipality of the Canton of Geneva.

The name Chemin des Mérinos is a reference to a timetime when Charles Pictet, who also founded the current town hall in Laney, bred merino sheep. It was in 1799, when Lancy was occupied by the French army and integrated into Savoy, that Pictet introduced the first 12 Merino sheep to the meadows of Grand-Lancy.

Today's Chemin des Mérinos is urbanised. We created solutions to retain and delay rainwater from the surrounding roads, paths and buildings by, e.g., establishing a vegetated valley, planting trees, shrubs and a meadow, while creating quite a unique water retention basin with anchored walls and permeable greenery in between.



BLUE GREEN SOLUTIONS

Urban water management

Our climate adaptation solutions include the creation of raingardens, swales, tree pits, permeable coating and vegetation that increases water retention, as well as other blue-green infrastructure for sustainable urban stormwater management. Green roofs can retain between 40-100% of rainfall, depending on the season and type of roof. Trees planted over open, impervious surfaces such as parking lots can reduce stormwater runoff by as much as 20 percent, as well as providing benefits such as shade and cooling.

We see our climate adaptation projects as opportunities to create recreational areas for citizens and communities, and we always think of creative ways to include sport facilities, playgrounds, leisure parks or spots for relaxation as well as give room for biodiversity to bloom and thrive – this is especially important in urban areas, where people and nature live side by side.



Bosch Rainwater Cisterns – Natural water retention

The aim of the project at the Bosch Renningen company site was to collect rainwater from the roof areas via three sedimentation basins. We have constructed a lake for a natural water retention, but at the same time created an ecosystem that brings life and biodiversity to the site.

At a different location, at Bosh Power Tools company site, another measure for water retention was needed. Here the aim was to create a cistern in a box-like structure, with the outer skin made of foil and fleece as a protective layer. The cistern collects the rainwater from the roofs and pavement areas and can be used for watering the planting areas.

The same challenge can call for different solutions

Nature is everchanging and diverse. Nature at one site may be completely different from nature at a nearby area. Our approach to selecting the right nature-based solution is therefore unique. We offer a variety of solutions, e.g., managing water enabling us to protect areas from flooding or consequential damage from drought, while also harvesting water resources for later reuse.





Glasgow City – Transplanting and drainage

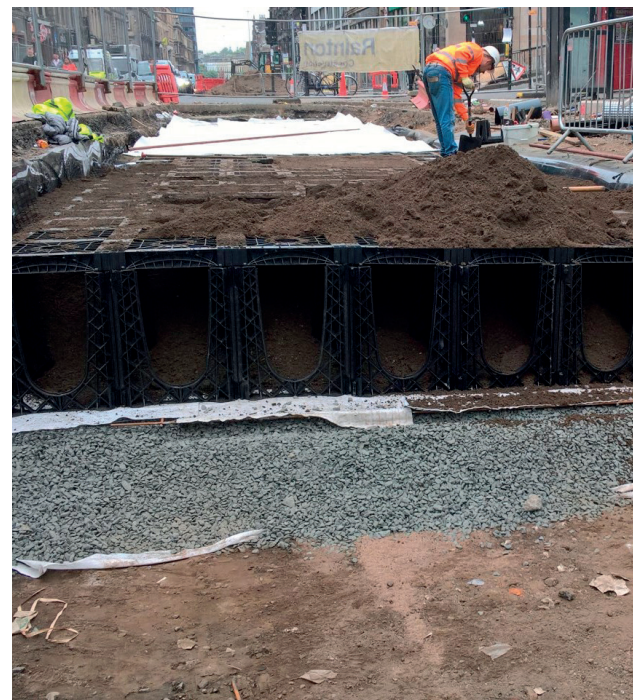
The aim of this project was to improve the management of surface water, improve urban air quality and reintroduce biodiversity into the area.

The amount of surface water is increasingly abundant and overflows on sidewalks, gutters and sewers. Therefore, we carried out the construction of an underground network of infrastructure and pipes connecting pits of the carefully transplanted trees together.

These trees also provide a measure of pollution absorbance and help cope with stormwater management by treating water run off from the paving areas through the tree pit soil.

Our design required sufficient attenuation capacity of our rooting space and the design of outfalls to remove over-capacity at a controlled rate into the sewers.

Furthermore, the established Rain gardens are being tested, monitored and managed by idverde. The floors used for the development of the rain gardens are the same as those of the pits for the trees. Tests of the water from these two urban drainage systems show it has been purified and partly depolluted, hence improving the quality of the rainwater.



We use the water

Sensors in the water tanks used for irrigation will give live reporting to ensure that the water quality is sufficient for watering and that it has not been contaminated.

In cases of smaller contaminations, remedies can be implemented to make the water reusable.

BLUE GREEN SOLUTIONS



Visualization by: Gaiihede



Olufsgaard – Urban drainage

Olufsgaard is a housing association, where the apartment owners joined forces in handling their rain- and surface water locally on the site instead of using communal sewages. When doing so, Olufsgaard received a 40% refund on their connection fee.

Rainwater is now being directed from roof surfaces, green areas, roads and parking spaces into open gutters made of cobblestones as well as rainwater basins and rainbeds with biodiverse meadows, grasses or perennial plants. The water evaporates and seeps into the ground.

The solution at Olufsgaard provides mixed terrain that is more exciting to look at, while the access to water also creates more optimal living conditions for insects and small animals.

Traditional climate adaptation projects often include adding drainage pipes, water storage tanks and fascines. When possible, idverde prefers to create a landscape which delays rainwater runoff through nature-based solutions.

The need for fewer materials and less manpower and therefore reduced CO₂ emissions make this nature-based solution a natural first choice.

Rainwater harvesting

Rainwater harvesting refers to the local use of rainwater instead of clean drinking water for irrigation or various other purposes. Only a decade ago, cities considered rainwater as something to be evacuated as fast as possible, leading to increased flood risk and sewer overflows during heavy rain events. Adapting to climate change requires rethinking of urban rainwater management in order to retain rainwater locally, to reduce the need for irrigation and to mitigate both flood and drought in urban areas, which are often addressed most cost-effectively through nature-based solutions.



Regenboogbuurt (Rainbow neighbourhood) – Climate adaptation

The neighbourhood is undergoing major renovation as the soil is subsiding in several places. To make the city fit for the future, climate adaptation is an important part of the project – with *idverde* as advisor. With its already high risk of flooding, the increasing amounts of rain will become a larger threat to communities in the Netherlands. Therefore, several measures are being taken by *idverde* to combat flooding, e.g., drainage and the use of greenery.

Furthermore this project is about greening the neighborhood for more infiltration and storage of rainwater, increasing information, reducing heat stress and creating a more liveable neighbourhood.

Trees play an important role in reducing heat stress and making Regenboogbuurt more 'liveable'. A climate laboratory has been set up on site, where people can learn more about how trees cool down their environment.

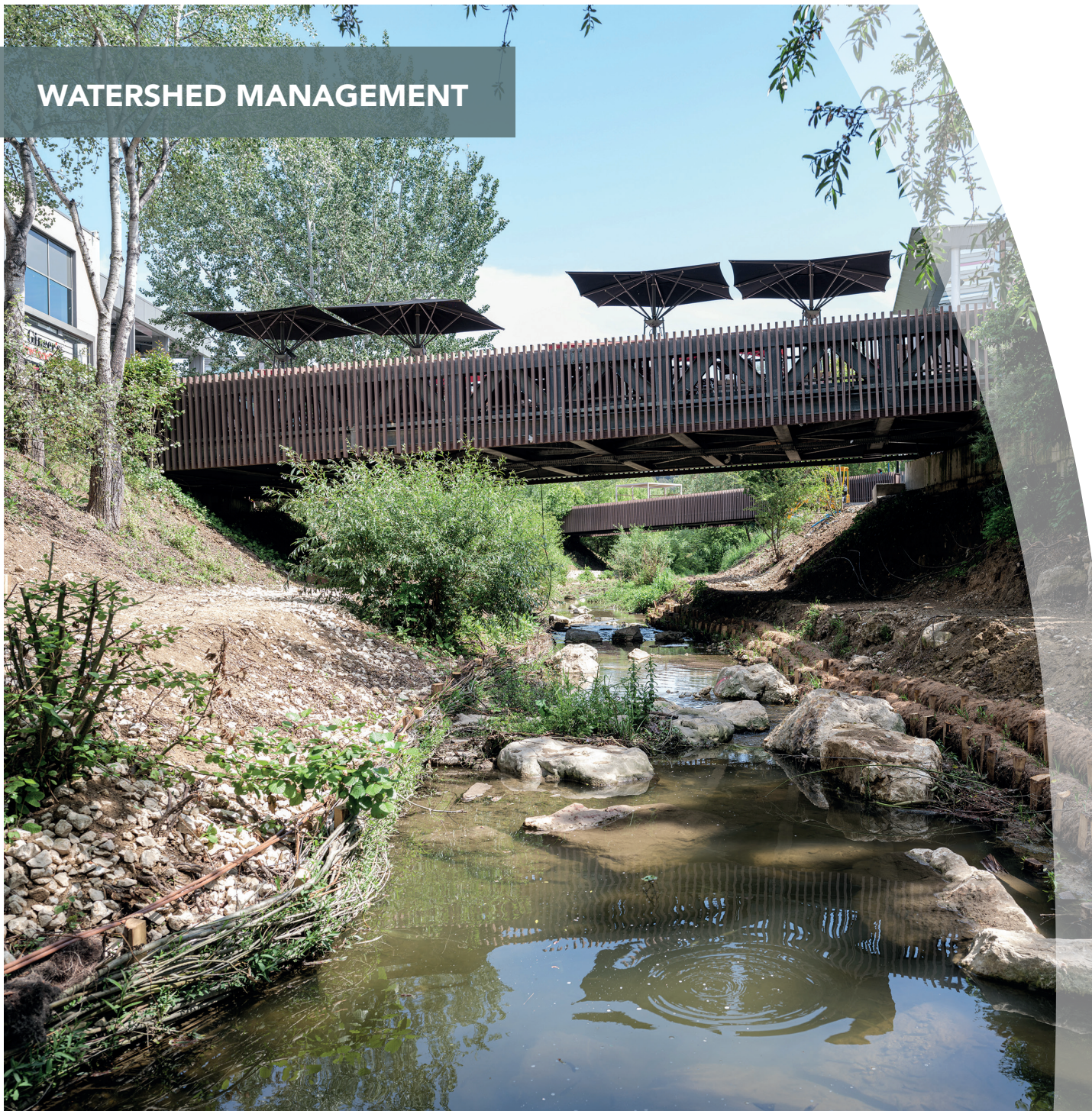
74 trees have been planted with different characteristics such as crown shape, the structure and shape of the branches and the colour of the leaves. For each tree, temperature measurements are made under different weather conditions. We are also investigating how trees can direct wind into the district's streets to achieve a cooling effect. Our data show how the different trees and greenery affect the temperature and exactly how efficient the trees are, in cooling down the environment, improving air quality and creating more urban nature.



Creating permeable coatings

When creating permeable coatings, we can work in many directions. At Regenboogbuurt, we removed tiles leaving small holes in between that were sowed with grass seeds. Grass reinforcement blocks combine good infiltration properties with a visual greening of the surface. The wear resistance and water retention capacity is improved as well.

WATERSHED MANAGEMENT



Watershed management

A watershed is an area of land that drains or sheds water into a specific receiving waterbody. The term watershed management is used to describe our process of implementing practices to protect and improve water quality and other natural resources within a watershed.

We specialise in wetland, riverbed or floodplain restoration and maintenance, which help secure water supplies as well as reducing flood risks.

One of the consequences of climate change is more extreme and unstable weather with heavy rainfalls and flooding. Water is especially challenging as floods are very damaging to local communities, while water is also one of the main growth conditions for plants and trees.

By taking a nature-based approach to watershed management, it is possible to benefit both nature and people in a range of ways. Our solutions include reinforcing riverbeds, preventing rivers from drying out, revegetating riverbanks, water diversion and reconnecting water streams.

With nature-based watershed management flooding risk can be minimised, while also reducing nutrient run off, mitigating against the impacts of drought and creating or restoring habitats and ecosystems.

Natural water cycles

Watershed management is important because watersheds ultimately drain to other bodies of water. It is vital to consider downstream impacts when developing and implementing water quality protection and restoration actions. A serious deterioration in downstream water quality has happened over the years despite its importance as a drinking-water source for millions of people.

Restoring aquatic ecosystems

Restoration is an integral part of watershed management. Aquatic restoration measures can increase natural storage capacity and reduce flood risk by re-connecting brooks, streams and rivers to floodplains, former meanders and other natural storage areas, while enhancing the quality and capacity of wetlands.

We restore wetlands to maintain nature's ability to fulfill these services as well as achieve a healthy aquatic ecosystem. Good functioning aquatic ecosystems play a key role in sustaining or improving water quality by trapping sediments, filtering pollutants and absorbing nutrients.

Our physical restoration solutions include re-meandering (bringing back the natural curves of a river), creating vegetated riverbanks or returning a watercourse to its original bed to reconnect it with its associated groundwater.

Lakes, rivers and wetlands are of vital importance for biodiversity because they support a large number of species, e.g., birds, mammals, amphibians, reptiles and plants. Many species rely on the regular flooding cycles of wetlands to reproduce. Wetlands are also vital for freshwater fish, as many of these species require shallow wetlands to breed.



Haus an der Aich – Riverbed rehabilitation



Haus an der Aich is a nursing home located on the small river Aich, which flows through Waldenbuch in Germany. Heavy rain and massive flooding threatens Waldenbuch but new studies of the area have identified the 'hotspots' and they now serve as a basis for protective measures. One of the vital flaws of the river Aich is that the water channel that leads to the rainwater retention basin at the Liebenaukreisel is too narrow. We ensured stream restoration as a compensatory measure, as the riverside was under stress from the housing project. The riverside was secured with natural materials, e.g., dry and natural wood as well as water plants.

Vision One – Stabilising riversides



The Vision One project in Leinfelden-Echterdingen consists of 4 new office buildings that stand on a spacious 13,500 m² site filled with greenery on top of an underground parking basement. With the heavy expansion of the area, the surrounding nature was facing a lot of changes especially due to drainage and the sealing of existing rainwater collecting areas. We did a series of compensatory and restorative measures in the nearby water streams, such as securing the river sides from erosion, redirecting rainwater, and making sure the ecosystem wouldn't dry out.

WATERSHED MANAGEMENT



Ville de La Rochelle – Wetlands and ecosystem restorations

The Marais de Tasdon is a vast natural space covering more than 82 hectares at the gates to central La Rochelle. The Tasdon ecosystem was sadly on the verge of disappearing as the wetlands became disconnected from the sea and began running dry. We have therefore taken part in a vast two-year ecological project for the renaturation of this wetland, connecting it to the Moulinette Stream for freshwater irrigation and the ocean for saltwater supply. We helped restore 10 hectares of wetlands and 20

kilometres of riverbed, securing the riverbanks and renaturing the surrounding ecosystem. After removing rampant invasive species, a total of 63,000 native aquatic plants and 1,300 shrubs and trees were planted. Located between the Rochefort and Poitevin marshes and the Yves and Aiguillon nature reserves, Marais de Tasdon is home to 350 characteristic flora of the marshes and 150 types of birds, e.g., migrating birds that take refuge here for the winter. The area is a true immersion in nature.

Carbon sink in La Rochelle

With the restoration of wetlands, we have created an area for effective carbon sink. The entire wetlands of the La Rochelle area can absorb an around 160,000 tons of CO₂ per year.

Wetlands as carbon sinks

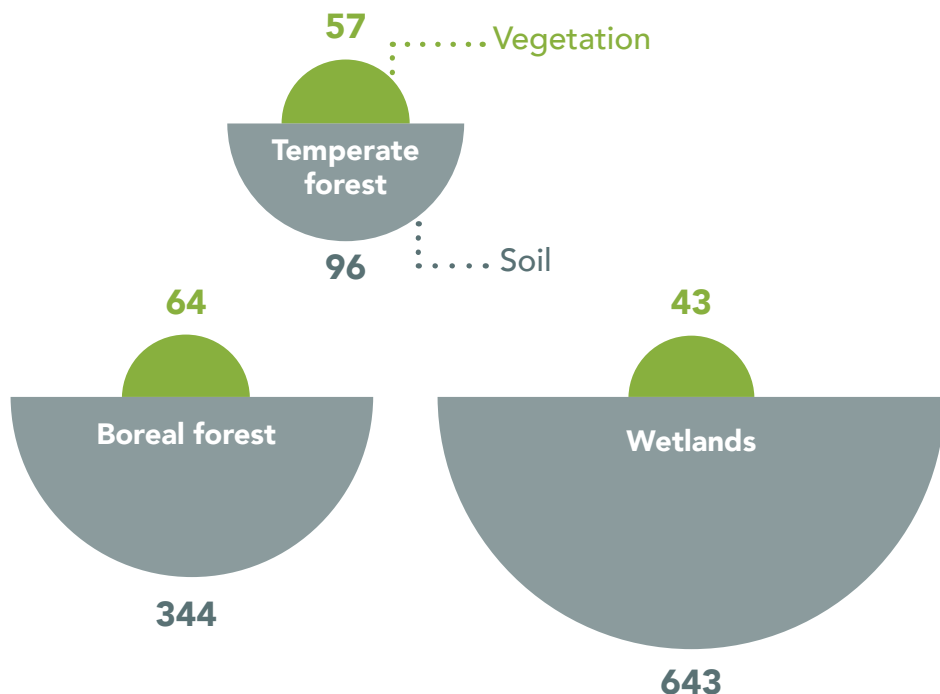
Low-lying areas form an important pathway between waterbodies such as rivers, lakes or the ocean and the dry land, creating important habitats for certain plants and animal species. By restoring low-lying areas and establishing wetlands, we can increase biodiversity as well as retain surface water and hereby reduce the risk of acute flooding in residential areas or coastal waters.

Peat soils are a type of organic soil developed over centuries under wetland conditions by the accumulation of decomposed plant residues. By not cultivating peat soil areas and restoring the area to wetlands, we ensure that centuries' worth of captured CO₂ stays in the soil instead of being released into the atmosphere.

Wetlands can also withhold nitrogen and nutrients, which would otherwise end up in the ocean increasing the amount of algae growth and depriving coastal water of oxygen.

Carbon storage in different ecosystems

Tonnes of Carbon per Hectare each year*



*Average stored carbon at a ground depth of one meter
Source: IPCC



Photocredit: Nrel Hoskins



River Cray – Securing biodiversity

We manage sections of the riparian habitat along the River Cray, a chalk stream in London Borough of Bromley. There are only 210 chalk rivers on the planet – 85% of them in England. They are characterised by clear water and diverse plant life, but unfortunately most of England's chalk streams are in poor condition.

Our work benefitting the River Cray is focussed on managing the land to benefit biodiversity. We do this through the creation and delivery of a habitat management plan and partnership working with key stakeholders.

Our management plan has led to the implementation of relaxed grass cutting regimes within the riparian buffer zone. This creates terrestrial habitat for terrestrial species but also many semi-aquatic species, which occupy both land and water. These buffer zones help alleviate nutrient run off entering the river via hard infrastructure in the surrounding area. We manage these areas according to a traditional meadow cut regime, leaving approximately 20% uncut on a rotational basis each year to provide overwintering habitat.

WATERSHED MANAGEMENT



Etang biotope de La Gavotte – Sustainable drainage systems

In the district of La Gavotte, heavy rainfall often generates serious flooding. Since 2010 the city has taken actions to manage the water and mitigate the consequences of climate change.

We have created two water retention basins with the purpose of reducing flood risk. The first basin has a volume of 3,500 m³ and harvests rainwater from the entire Val St Georges hill. The second basin, which has an effective volume of 7,800 m³, is located in the Jean Giono park between the Amandiers park and the Chemin des Boeufs. This basin delays rainwater coming from the entire Almond Trees hill area.

Both retention basins are established as green areas, to which we have contributed by creating a new biotope for the natural flora and fauna in the area. La Gavotte is open to the public, so children can visit the farm animals or play by the water, and walkers and sports enthusiasts can enjoy the new sports area.

Watch a video on La Gavotte

The Grand JD, famous Geneva youtuber, invites you to discover an area with many facets: biotope for fauna and flora, rainwater collection basin, but also an awareness space for children visiting the site.



The video is in french.
Published in 2021.



Ville de Calais – Rainwater management



Ville de Calais is an area rich in tradition, landscape and history. The urban history of Calais is very closely linked to the city's location by the sea. After three years of work, the new Calais waterfront is now inaugurated. The ambition for the area was to make Calais a seaside resort, a must-see tourist spot, that unite three forces – culture, leisure and sport – and forge its identity as a major living space and a showcase for the city.

In a first phase of the project, the link between the ocean and the city was recreated by establishing a new avenue and a landscape that matches the characteristics of the northern coastline in France, its dunes and its marram grass shaping a rich and diversified greenery. New trees (554) were planted.

Phase 2 of the project widened the existing promenade, installed a 4,000 m² skatepark, a city-stadium, shelters, wooden deckchairs as well as recreative infrastructure that welcome visitors. Certain pedestrian lines are dedicated to rest and contemplation, while other routes are dedicated to mobility, discovery and activities.

Our project at Ville de Calais also included creating nature-based solutions to manage rainwater.



River Maas – Smart river management

We ensure the maintenance for the river Maas in the Netherlands. The total surface of the project is 8.110 hectares, along 300 km river and canals. We have made a solution for keeping track on the maintenance work.

Everything is mapped and tracked. We use ArcGis to map trees, buildings and the whole green structure.

Maintenance, improvement projects as well as approx. 200 unplanned events a year is documented by tablet or phone. In combination with Streetview and daily visual input from our people in the field, this solution offers great oversight and transparency and leads to a high quality of maintenance. Both the client and our knowledge center and alle employees is connected to the database, and therefor always have an on-time updated overview.



CREATING AND RESTORING ECOSYSTEMS

Biodiversity and CO₂ capture

The nature of our work as landscapers and a green space management contractor means that we treat biodiversity as a priority and are experts in ensuring it is conserved and enhanced. Our ecosystems are under threat from a wide range of pressures, and *idverde* are perfectly placed to not only mitigate harm but to improve biodiversity at local and regional levels.

We are specialists in producing ecological management and maintenance plans, biodiversity action plans, nature recovery strategies, ecological monitoring, habitat creation & management and species conservation.

Where appropriate we utilise technology to support our work for example by using AI to identify the presence of Invasive Non Native Species and environmental DNA

sampling to identify the presence of protected species. Our ecologists take an evidence based approach to determine the most suitable management interventions for the ecology of any given site while also considering climate resilience in the future management.

To promote biodiversity, our specialists determine the native local species and plants that will be most appropriate for the soil, climate and surroundings, and recommend the combinations of plants that provide the best habitat for biodiversity as well as capturing CO₂.

As a leading provider of grounds maintenance services and landscape creation projects across Europe, *idverde* manages a large area of grassland across different landscapes. Grassland is an undervalued habitat in

terms of carbon storage. Up to 30% of the earth's carbon is stored by grasslands. This places *idverde* in the perfect position to maximise climate resilience in a range of contexts from elite sports pitches to housing developments, public parks and nature reserves.

Exactly how much carbon a tree or a grassland holds depend on the species and growth rate. *idverde's* specialists have co-developed the global *i-tree* methodology over the past eight years, adapting it to over 300 tree species and enabling us to calculate the rate of CO₂ capture for any type of tree.

We live up to the different environmental policies in Europe

- The EU is developing common guidelines on when an investment is considered sustainable. At least 60% of horizontal surfaces are dedicated to habitats and additional biodiversity
- In France, biodiversity and ecology are defined by a certificate
- In England, from 2023 all biodiversity loss resulting from development will be required to be offset to demonstrate a minimum net gain of 10%.
- In Denmark, there is a national monitoring program that monitors the environment and state of nature in prioritised areas in relation to the political and financial framework
- In DGNB certified buildings, biodiversity forms part of the overall environmental assessment



CREATING AND RESTORING ECOSYSTEMS

London Borough of Bromley – Restoration and preservation



London Borough of Bromley is London's largest, greenest and most heavily wooded Borough. *idverde* manages all public greenspace on behalf of the municipal authority.

Bromley contains a wide range of semi-natural habitat types including ancient woodlands, wetlands, chalk, acid and neutral grasslands, veteran trees, farmlands and some of London's last remaining lowland heath and valley mire, many of which contain protected species. We adopt a landscape level approach to the management of these greenspaces and by using systematic ecological monitoring programmes we are able to identify which species require specific conservation action for example hazel dormouse and European adder.

Our habitat management is a critical element of achieving the *idverde* Bromley Biodiversity Action Plan and is supported by our partnership with the RSPB. Furthermore *idverde* work closely with communities and partners to support conservation efforts across the Borough on a wide spectrum of taxonomic groups from mammals to lichens, reptiles to orchids.

Bromley has 93 Sites of Importance for Nature Conservation (SINCs), which includes three *idverde* managed Sites of Special Scientific Interest (SSSIs) and 5 Local Nature Reserves (LNRs).

Our aim is to protect and conserve Bromley's countryside and provide facilities, access and opportunities for people to enjoy it without compromising animals and their habitats.



Conserving biodiversity is critical

It is now widely recognized that climate change and biodiversity are interconnected. Biodiversity is affected by climate change with negative consequences for human well-being, but biodiversity, through the ecosystem services it supports, also makes an important contribution to both climate-change mitigation and adaptation. Consequently, conserving and sustainably managing biodiversity is critical to addressing climate change.

Source: The Convention on Biological Diversity



Photocredit: Julie Kierkegaard



Bakkedraget – Ecosystem and monitoring

Bakkedraget is a luxurious apartment complex with a natural-looking landscape that fits into the existing coastal environment. The aim of the project is to create a unique and sustainable area that is easy to maintain and with lots of biodiversity.

Recycling and using the already available resources at the site have been top priorities for idverde and the partners involved. This included reusing the soil for shaping the terrain, planting and enhancing the growth of the already established plants. The soil was scarce in nutrients, but the carefully selected plants for the beach meadow are thriving, so the main task is to support the growth conditions and increase the existing biodiversity of the area.

Nature-based solutions

- Using and reusing existing resources
- Restoring the existing biotope by carefully selecting a variety of plants that complement the already established plants
- Creating a beach meadow that accommodates the existing coastal area to benefit the local animals and insects

CREATING AND RESTORING ECOSYSTEMS



Bispebjerg healing gardens – Well-being as value

The healing gardens that surround Bispebjerg Hospital's buildings were originally established over 100 years ago and were supposed to promote healing and support for the hospital's patients.

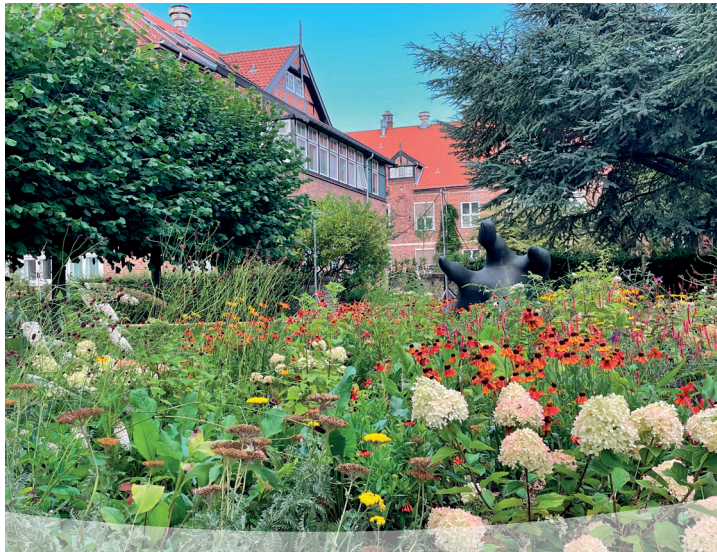
A restoration of the gardens has been necessary as it has undergone changes over time. Much of the original planting has e.g. been replaced with grassland. The garden had become difficult to access for patients in wheelchairs or hospital beds, and the increased climate challenges have made it necessary to secure the gardens and its roads against cloudbursts.

With the help of landscape architects, we have studied the original extensive botanical plant lists. As in the original gardens of Bispebjerg Hospital, we have included original medical and native plants, to honour the original project, but also to attract insects and birds, which makes the garden more alive.

The old paths have been restored and the gardens are now a green and blooming oases open all year for patients as well as the public.

Spending time in nature can have a healing and calming effect, and the gardens have become an integral part of hospital treatments for e.g., terminally ill patients.

The healing garden is established to speak to the last senses. It was therefore important that patients are able to see flowers from all angles and that the flowers should have a strong scent in some areas and a weak scent in others. Creating an area with buzzing insects and birds chirping was also important because the sense of hearing is the last remaining sense for many patients.



Reducing stress

- Restoring the hospital gardens with original medical and native plants to attract insects and birds, which makes the garden more alive.
- Climate adaptation to secure the area against future cloudbursts.
- Rethinking the garden plan to increase access for patients – 20 minutes of daily contact with nature can significantly reduce the stress hormone cortisol.
- “Our study shows that the biggest pay-off when it comes to reducing the stress hormone cortisol is spending 20 to 30 minutes a day in a place that gives you a sense of nature. It can be either sitting or walking,” says MaryCarol Hunter, a professor at the University of Michigan and lead author of the study.



De Groenzoom – Conservation and recreation areas

Welcome to De Groenzoom, a long stretch of land reserved as a nature conservation area that covers 560 hectares and is located between cities of The Hague, Delft and Rotterdam in the 'green heart' of the Netherlands. Going back 50 or 60 years, De Groenzoom was part of a large polder landscape, where most people lived on and alongside dykes. The landscape was open and situated six metres below sea level.

Some of the challenges to this land today are the consequential effects of climate change, diminishing biodiversity and decreasing community involvement.

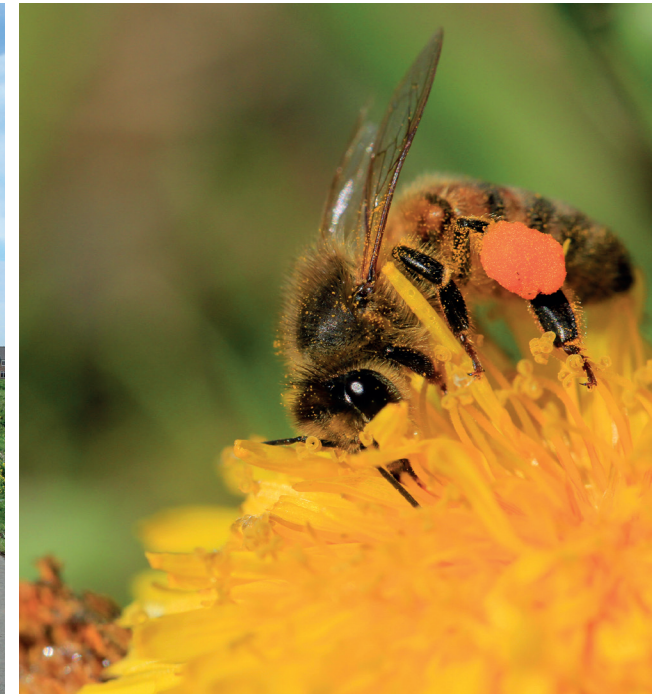
We develop various types of vegetation, especially grasslands by carrying out management on the basis of a management plan, monitoring the development and adjusting management where necessary. This focuses on various grassland types with their own target species and characteristics.

The area De Groenzoom mostly consist of marshes, flowering dykes, wetlands and other types of grasslands. Through our maintenance, we stimulate the natural qualities on the site and develop other natural values characteristic for these grasslands. We have created new ecological biotopes and increased the area's biodiversity. We monitor nature developments and inform both visitors and the locals about nature and biodiversity.

Offering extra value

- Developing high-quality nature
- Stimulate local involvement by working together with local partners and residents
- Multidisciplinary team composed of site managers and ecologists
- Developing maintenance plans

Photocredit: Cor Noorman





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