







Dunea supplies drinking water to 1.2 million people and every year welcomes over a million visitors to the dunes between Katwijk and Monster. We supply around 73 billion litres of drinking water each year.

## **Profile**

## A dynamic organisation

The municipalities in the service area are our shareholders and the Supervisory Board supervises the Board of Management. Organisationally the company is divided into five sectors: Water, Customers & Nature, Information Provision & Facility Management, Finance & Management Consultancy, and Human Resources. Every day over five hundred Dunea employees dedicate themselves to ensuring high-quality drinking water, a high level of service reliability and the protection of a beautiful area of dunes that offers many recreational possibilities for young and old in the heart of the Randstad, a busy area in the Netherlands.

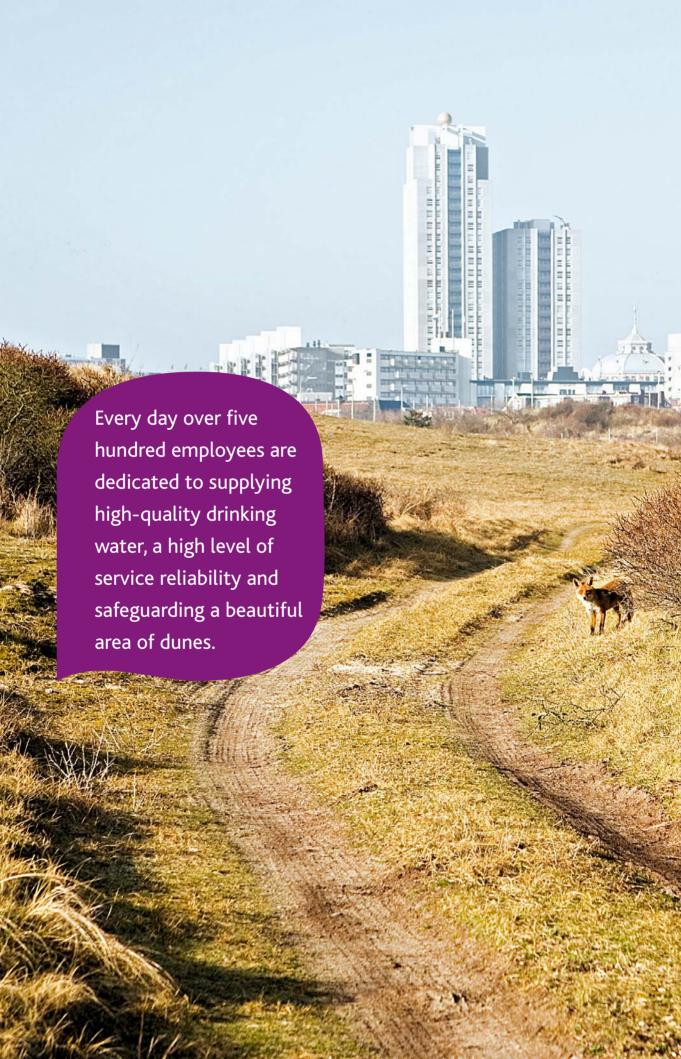


## Dunea has a great deal to offer

Dunea has passionate and dedicated staff, a high level of technical expertise and a customer-oriented sales organisation. Our employees consider progress to be vital and enjoy working together and sharing and developing knowledge. There is ample scope for individual initiative. Dunea has an integrated vision on drinking water and nature conservancy and has set this out in its *Koers 2015* (Towards 2015), which was developed together with many of its staff.

## The unique link between dunes and water

Dunea supplies pure drinking water in harmony with nature. Dunea strives for excellent products and services that are continuously adapted to the needs of the region and its customers. The management constantly seeks to strike a healthy balance between quality, profit and investment. Efficient business processes mean we can deliver an optimum performance, now and in the future. Dunea is bound to nature, its surroundings, society and the people who live, work, play and drink water within its area. We are making progress together.



# The history of dune water

Until the end of the nineteenth century untreated water from ditches, rivers, wells and other sources was used as drinking water in the Netherlands. The result was regular cholera and typhus epidemics, which killed thousands of people. It became clear that better drinking water supplies were needed, and the first drinking water companies were established.



#### Fresh over salt

Hundreds of years of precipitation filtering through the sand had created a large reservoir of fresh water under the dunes. Fresh water floats on salt water and here and there fresh water appeared at the surface. This water turned out to be a good raw material for the preparation of drinking water.

In the beginning the extraction of the water was, technically speaking, very simple. Channels were dug in the dunes into which the fresh water flowed by itself. A final purification using sand filters was sufficient to produce drinking water, which was then piped to taps in the city.



#### The first water meter

The population increased around 1900 and the demand for drinking water rose accordingly. The large-scale extraction of water was therefore established. Most of the houses and business premises were connected to the water supply and fitted with water meters: the first water conservation measure.

Despite this measure, more water was being extracted from the dunes than was falling as precipitation. In time this would have led to the dune water becoming brackish. In order to continue to be able to meet the demand for drinking water, from 1940 onwards river or polder water was transported to the dunes.

Top: laying pipelines in the city.

Centre: pressure in the network is regulated using this simple (at first sight) pressure control.

Bottom: until the nineteenth century the village pump was often the only source of (drinking) water.

In 2012 Dunea switched from local operation at every production facility to fully automated processing (FAP). After the required quantity of drinking water has been calculated each day by computer the production is fully automatic. During the period 2004 to 2012 all the production facilities were made ready for this change: pumps, valves, electrical switching cabinets, water softening installations, filter washing – everything is automated in the same way so that all the production facilities can be controlled from a central point.

In 2011 Dunea also took two new pumping stations into service at the Scheveningen production facility. This investment has further improved service reliability. Customers are guaranteed a continuous supply of reliable drinking water, even during calamities. The pumps suck the drinking water up from the storage cellars and pump it towards the taps in consumers' houses via around 4,500 kilometre of pipe. The emergency power is provided by diesel engines. Should the electricity supply be interrupted enormous generators ensure that our delicious dune water is supplied as usual. On average we supply around 74 billion litres of drinking water a year.

Reliable technology for reliable drinking water

Almost twenty years ago Dunea began introducing horses and cattle into Meijendel so that by grazing on the dunes they would stop the area from becoming overgrown. At the end of 2009 the Helmduinen grazing area was extended to include the Libellenvallei and the Prinsenduin. This resulted in a unique situation. Although dogs and horse riders are normally unwelcome in Dunea's grazing areas, as the Libellenvallei and the Prinsenduin have always been accessible to recreational visitors, and as this is the only access route to the beach in the area, Dunea has made an exception. Walkers with dogs (on a lead), cyclists and horse riders still have access to the Libellenvallei and the Prinsenduin and remain very welcome.





Top left: marram grass planters in the dunes.
Top right: Meijendel Tea Garden in 1941.
Centre: around 1900 most houses were connected directly to the water supply.
Bottom: laying pipelines in the dunes.





Around 1900 most of the houses and business premises were connected to the water supply.



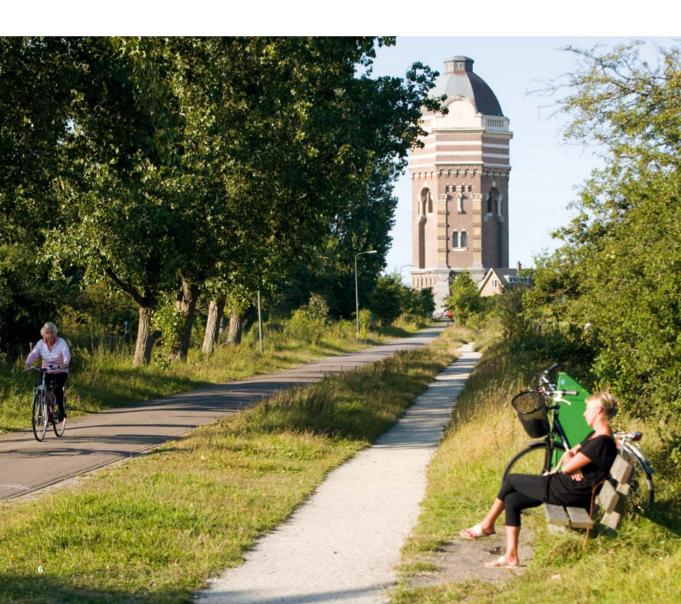
In the 1980s the Province of South Holland decided that the drinking water supplies in the province had to be reorganised. In 1990 local water companies were merged and the Duinwaterbedrijf Zuid-Holland (South Holland Dune Water Company) was established. In 2009 the company's name was changed to Dunea.

Since 1996 the entire dune area managed by Dunea has

been infiltrated with water from the Afgedamde Maas.

## **Changing nature conservancy**

Dunea's nature conservation activities began in the 1950s in Meijendel, Berkheide and Solleveld. Initially the management emphasis was primarily on water extraction. Today we seek to strike a balance: we want to supply high-quality pure drinking water and, at the same time, protect nature – in all its diversity – and to care for a beautiful area in which visitors can enjoy peace and space. Which is why around the turn of the century water extraction was stopped in a number of places so that nature could regenerate itself. And that has succeeded.



# From river water to drinking water

The original source of our water – a large reservoir of fresh water under the dunes – has been supplemented with river water from the Afgedamde Maas since 1976.

#### From source to dune

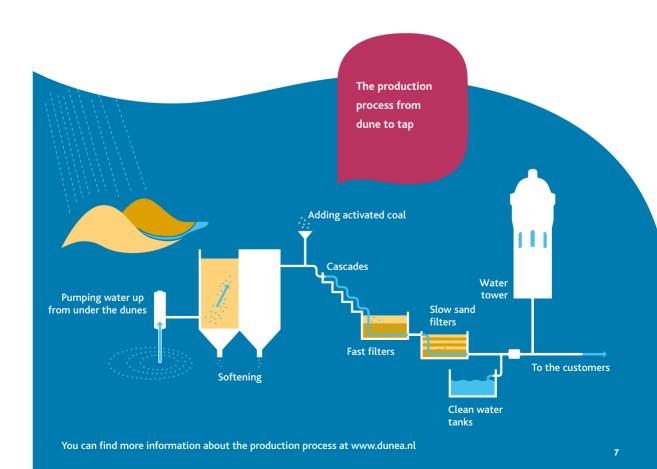
The Afgedamde Maas is a virtually current-free, twelve-kilometre-long, branch and dammed former distributary of the River Maas. In the two months that the water remains here, impurities and silt particles sink to the bottom. This gives the river a significant capacity to purify itself. By also adding iron sulphate (and oxygen) to the water ourselves, the quality of the water has already been considerably improved at source.

#### **Microsieves**

During the warmer months, microsieves in Brakel, on the North-Brabant and Gelderland border, extract as much (organic) material from the water as possible. The water then goes to Bergambacht (30 km further on), where it is pre-purified using sand filters. The pre-purified river water is then transported via two pipelines to the area of dunes between Monster and Katwijk where it is pumped into several infiltration basins.

#### **Dunes**

The water seeps slowly down from the infiltration basin to the bottom of the dune, where it mixes with sedimentary water. After a minimum of two months, most of the water is pumped up again. As the water sinks slowly to the bottom, its quality is improved and undesirable bacteria and viruses are made harmless in a natural way.



## From dune to tap

The dune water is turned into drinking water at Dunea's production sites in Scheveningen, Katwijk and Monster. Although the water pumped out of the dunes is already bacteriologically reliable, it is not yet ready to use.

#### Softening

Dune water is quite hard – around 13.4 degrees dH (German unit of hardness). Dunea feeds the water through a softening plant to extract the chalk and reduce the hardness of the water to an average of 8.5 degrees dH.

Softened water has several advantages. The softer the water the less soap and detergents are needed. Softer water also means less lime scale in household appliances. Water softening benefits both public health and the environment because softer water dissolves less lead and copper so less of these substances gets into the drinking water and waste water.

After softening, activated powdered coal is added to the water. This improves the taste and removes the remaining undesirable particles, such as pesticide residue. The coal is filtered out of the water again at a later stage.

#### Fast and slow sand filters

The water is then pumped via waterfalls (cascades) to the fast sand filters. Oxygen from the air binds itself to iron and manganese particles in the water (oxidisation). These particles and the powdered coal added earlier remain behind in the sand filters.

The final step in the purification process is passing through the slow sand filters. The biological action of the sand filters makes the water totally bacteriologically safe.

The dune water is now drinking water. The drinking water is stored in pure water reservoirs so Dunea can deliver pure and safe drinking water 24 hours a day. Water towers ensure that there is constant pressure on the water mains network – even if there is a power cut.







Dunea strives for a sustainable balance between water extraction, nature conservancy and environment management. Our environmental policy is aimed at making our activities more sustainable, including through the implementation of energy savings, sustainable energy sources and CO<sub>2</sub> compensation projects. We work with government programmes, such as Sustainable Purchasing, sustainable Building and the Cradle-to-Cradle principle. Dunea is also a member of the Sustainable Platform The Hague, which involves companies, government organisations and housing associations working together to accelerate sustainable development in the region.

When seeking a new head office our environmental policy was of overriding importance. Because Dunea wants to use raw materials economically, redeveloping an existing office building was preferred to building a new one. The antiquated (energy label E) office on the Plein van de Verenigde Naties is, therefore, being sustainably converted into a modern office with an energy label B. We expect the building to be ready for occupation in 2014. Until then Dunea will work from temporary accommodation on the Louis Braillelaan in Zoetermeer.

Environmental policy and offices

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#### Kilometres of water mains

The dune water, which is now real drinking water, is transported from Dunea's production facilities to businesses, institutions and around 1.2 million people via kilometres of pipelines. Thanks to good maintenance of the distribution network coupled with timely investment, on average our customers experience just four minutes a year without water due to a supply interruption.

The transportation pipelines through which the drinking water is transported from the production facilities to the cities and villages are the arteries of the drinking water system. In total there are 286 kilometres of transportation pipes with a diameter of between 400 mm and 1,500 mm.

Mains pipes are branches of the transport pipeline and are in every street. Mains pipes have a diameter of 63 mm to 300 mm. The total length of the mains pipeline network is 4,321 kilometres. Finally, to take the drinking water to the consumer, the water meter or mains tap in every house is linked to the mains pipe in the street via a supply pipe.



## Twelve buckets a day

In the Netherlands we use an average of 121 litres of drinking water per person per day. That is over twelve bucketfuls. Most of this water is used for showering or flushing the toilet. Americans use five times as much water as Europeans. In Africa average usage is less than 10 litres per person per day.

## **Guaranteed quality**

Dunea's drinking water is monitored on a daily basis to ensure it complies with the extensive range of quality requirements laid down in the Water Supply Act and the Water Supply Decree. This begins at the source, the Afgedamde Maas, where the water is checked to ensure the quality is good enough for it to be transported to the dunes. Careful monitoring of the water quality continues throughout the entire production process. And quality control does not stop there: to check the quality of the water at the end of the distribution chain, samples of tap water are taken from houses served by Dunea.

## Nature and recreation in the Randstad

Those who want to escape the bustle of the Randstad can find peace and breathing space amongst the dunes. The dunes are valuable and protected nature reserves that are important for plants and animals. At the same time they play a crucial role in the production of drinking water for 1.2 million people. And because the dunes have been protecting us from the sea for centuries they contain traces of human history: visible and hidden treasures from our rich past.

Dunes, water, our cultural heritage and recreation: all these different functions are played out within an area f around 2,700 hectares. Our challenge is to harmonise these different functions and bring them into balance. That is something we are working hard to achieve, together with the province, the municipalities, the landowners and our visitors.

## Inextricably bound together

Nature and water extraction in the dunes have been inextricably bound together for over 135 years. Nature has made the water extraction possible. And the water extraction has, in its turn, protected nature once again. Thanks to the drinking water production facilities, the dunes have been protected from urbanisation and road building. The presence of infiltration basins has also created a wide variety of new biotopes in the dunes — open water, reed beds, bogs, damp and dry dune valleys,

At the end of March the first visiting birds return to breed in the dunes. Generally the willow warbler arrives first, followed about a fortnight later by the nightingale and blackcap.

dune grasslands, short and tall scrub and woodland. Thanks to this diversity, Meijendel has evolved into one of the richest areas for bird life in the Netherlands. An area with a wide variety of mammals, reptiles, insects, butterflies, dragonflies, damselflies and amphibians, together with numerous species of plants, fungi and mosses. In a nutshell: water extraction and nature form a perfect partnership. It is the combination of both functions that makes the dunes such beautiful places.

#### **Hidden treasures**

Many of the dunes' treasures are visible. But a great many more are hidden from view: traces of our rich past.

Potshards from the late Iron Age (± 250 BC) have been found and even a Merovingian burial site in Solleveld (450-750 AD) containing a lance, a sword and parts of a shield. There are fields and (the remains of) nineteenth century farmhouses and early twentieth century villas. Many species of bat hibernate every year in the bunkers left over from World War II. And natural processes have resulted in geological wonders and beautiful landscapes. All the cultural-historical elements have been recorded. A special cycle route through the dunes takes visitors past a variety of traces of the past.





In June and July the ponds are full of ducklings, and fox cubs and fawns can be seen. The orchids bloom in the damp dune valleys while mullein, evening primrose and ragwort colour the dunes yellow interspersed, for a bit of variety, with the blue of viper's bugloss.

## **Good nature conservancy**

Conservation is never finished. Which is why work in the dunes continues on a regular basis. From the major maintenance of wells and pipelines to the renovation of a dune access or tree ringing. Work that reinforces the various functions of the dunes – sometimes simultaneously. Removing the organic material from



From the end of October berrybearing shrubs send migrating birds their colourful message that there is plenty of food to be had in the dunes. infiltration basins not only means the natural sand filters work more effectively for example, but has a positive effect on nature at the same time. And submerged aquatic plants have a better chance of survival and the fauna responds positively. All work is planned to take place outside the breeding season and is carried out in a way that limits any inconvenience to holidaymakers and local residents as far as possible.

## Our dune areas

#### Meijendel

Meijendel, which lies between Scheveningen and Wassenaar, is a 1,875-hectare area of young dunes formed in the late Middle Ages. Meijendel ('Hawthorn Valley') is an extremely diverse dune area, rich in flora and fauna. The outer dunes are on the seaward side: an area with damp dune valleys and a fluctuating subterranean water table. Specific types of plants such as orchids, Parnassus grass and centaury grow here. In the central dunes, where the infiltration basins are located, the vegetation is taller with many hawthorn bushes and, in places, boggy areas, woods and reed beds. Between the central and inner dunes lie old agricultural valleys such as Meijendel, Kijfhoek and Bierlap, which consist mostly of woodland with some open areas of dune grass. Finally there are the inner dunes parabolic dunes separated by large valleys. The edge of the inner dunes is characterised by deeply wooded areas such as the Hertenkamp and the Klip.



#### **Berkheide**

Berkheide lies north of Meijendel, between Wassenaar and Katwijk. The Berkheide dunes cover 820 hectares and were formed in the late Middle Ages. This area is characterised by its small valleys and parabolic dunes. Berkheide is very open, consisting mainly of grasslands with small areas of woodland and scrub. In the spring swathes of Burnet Rose burst into flower on the slopes. Unlike Meijendel, Berkheide has no central valleys. Like Meijendel, it does have many small, former agricultural areas however. Many deer and foxes live there, and frogs and toads gather in the damp dune valleys in the spring.

#### Solleveld

Solleveld, at 135 hectares the smallest area of dunes managed by Dunea, lies south of The Hague. The landscape here is mainly characterised by old dunes formed long before the start of our era. The area is quite flat and has a rich archaeological history. The fields, embankments and old Roman road are all visible to this day. Gorse and elder bushes grow on the young, chalky sand on the seaward side. Where the dunes are deficient in lime, they are covered with mossy dune grass mixed with heather and there are some localised patches of woodland. The remainder is dry grassland. The old oak woods, with their carpet of bluebells stretching along the inner edge of the dunes, give Solleveld its own unique character. In the spring the large infiltration basin in the northern part of the dunes a favourite breeding place for visiting birds.

## **Visitor Centre De Tapuit**

De Tapuit, Dunea's new visitor centre in Meijendel, was officially opened by Prince Willem-Alexander and Princess Máxima during *Natuurfeestdag* 2012 (Nature Celebration Day). Here children and adults can experience nature's beauty and richness. De Tapuit is the ideal place to explore the dunes, to get to know the dune animals and plants and to learn about water extraction. Information about walking and cycling routes is also available to visitors from the information kiosk and café 'Onder de watertoren', on the edge of Meijendel.

Dunea's employees combine professionalism with a passion for their work. The personnel policy is geared towards the further development of these important qualities. Existing knowledge and expertise is safeguarded by ensuring they are actively exchanged between employees. New fields of knowledge are developed in-house as far as possible. In addition to knowledge development, Dunea also offers its employees flexibility. On the one hand through the flexible design of their workspaces and by offering flexible working arrangements and on the other hand by making clear agreements about performance. Dunea also offers employees excellent facilities for expanding their capabilities and competencies. All these efforts make Dunea an attractive employer, not only for existing staff, but certainly also for potential employees.

A dynamic organisation with dynamic employees

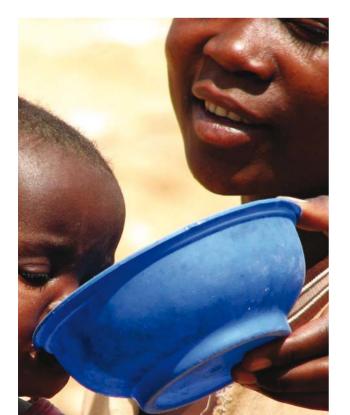


will continue until the summer of 2017.

## **Dunea** international

Clean water is a matter of life and death. Which is why everybody has the right to good, safe drinking water. There's a very good reason why the United Nations' Millennium Goal 7C is to halve the number of people around the world without access to safe drinking water and good sanitation in 2015.

Dunea is actively supporting the United nations' millennium goals. We are working with the Economic Advisory Service (Economische Voorlichtingsdienst – EVD), the International Association of Dutch Municipalities (Vereniging van Nederlandse Gemeenten International), the Netherlands Water Partnership and Simavi. Abroad we work with local organisations such as advice bureaus, universities and training establishments. Many of our customers and employees support our work abroad.





## Sharing knowledge and expertise

Thanks to the Millennium Goals, international collaboration has resulted in more people in South America and Asia being given access to clean drinking water. In Sub-Sahara Africa, however, the situation has still hardly improved. Which is why we are concentrating our international activities in this region. To be more precise, in Tanzania, where there are still many problems to be overcome.

Dunea is helping in Mwanza, in the extreme north of Tanzania, by working with the Mwauwasa waterworks company and the Lake Victoria Basin Water Office.

Dunea employees are sharing their knowledge and expertise and training colleagues from the local companies in the organisation of a good water supply, the location and repair of leaks and effective customer management. The collaboration agreement is for a period of five years. Regular progress reports of our activities are published on www.dunea.nl.

## With Simavi

Dunea began working with the Simavi development organisation back in 1999. We draw our customers' attention to the international drinking water problems and ask for a donation to one of Simavi's drinking water projects in a leaflet included with their annual invoices. The results have been fantastic. The generosity of consumers, businesses and institutions has enabled Simavi to carry out some very good work. During the past decade many people in countries including Malawi, Zambia, India, Bangladesh and Nepal have been given access to safe drinking water, sanitary facilities and information about the importance of hygiene. Thanks to our customers!

# Working together on the quality of the future

Dune water has been 'naturally good' since 1874. But technology is making great strides and all around us is in motion. The Randstad is increasingly crowded and the climate is changing. This demands sustainable quality; now and in the future: healthy and safe drinking water, good nature conservancy in the beautiful dunes and excellent service.

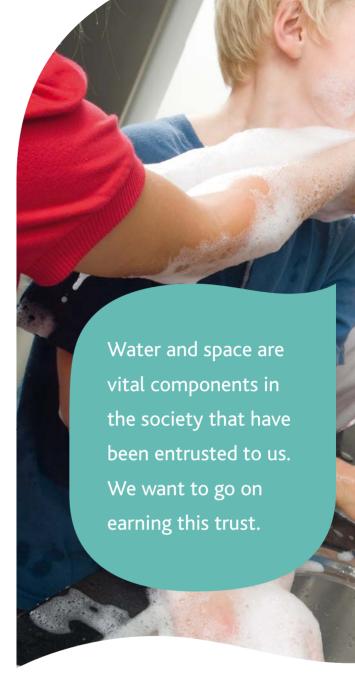
Dunea has formalised its integrated vision on drinking water and nature conservancy in its Koers 2015 (Towards 2015). A sustainable future demands corporate social responsibility, which includes deploying our expertise to achieve better management of the water chain and give more people around the world access to safe drinking water.

## Our challenge

Water and space are the basis for a good life. At Dunea we believe that a good life deserves only the best. What is good now will soon not be good enough. Which is why we are constantly searching for (new) solutions and possibilities for drinking water and nature. And when we can use our knowledge and expertise to benefit society we do so. Because that contributes to a sustainable future for us all.

## **Future-proof products and services**

Dunea supplies good and reliable drinking water in harmony with nature. We strive for excellent products and services that are constantly adapted to our surroundings and that respond to customers' needs. By 'customers' we do not only mean the consumers of our water but also the holidaymakers and nature-lovers, our internal customers, the owners of collective installations and our shareholders. We are constantly seeking to strike a healthy balance between quality, profit and investment. Our operating processes are designed to provide optimum performance, now and in the future.



## **Quality and reliability**

Consumers place great trust in the quality of our product. Dunea strives for a very high level of supply reliability and also makes every effort to ensure that inconvenience is minimised, even in exceptional circumstances.

We look after the precious nature of the dune areas, which are highly valued both in the Netherlands and throughout Europe. Our challenge is to use natural processes to withstand threats to the quality of the water.

## A dynamic organisation

Dunea employees are proactive, customer-oriented and focused on collaboration. They want to develop themselves and radiate expertise and passion. New knowledge is developed in-house. Dunea is an attractive employer for (potential) employees. A focus on knowledge development



motivates our employees, as do the flexible design of their workspaces, the flexible working arrangements they are offered and the opportunities provided to gain international experience. Clear agreements regarding performance – freedom versus obligation – contribute to a pleasant and challenging working atmosphere.

## Corporate social responsibility

Water and space are vital elements of society that have been entrusted to us. We want to continue earning this trust. We use our knowledge and expertise to benefit our society, for example in the water chain but also to create reliable drinking water facilities in other parts of the world.

We are transparent about our performance and thus generate society's trust. Trust in our drinking water, in how we manage the valuable dunes, in how we treat customers, the authorities and other social organisations.

## Working together and sharing together

Collaboration is vital if we are to face up to and cope with future developments. Which is why Dunea also focuses on collaboration throughout the value chain: between water, nature and recreation; with project developers in the construction world and also between drinking water, the sewer system and wastewater. To support plan formulation and sewer management, Dunea has clustered its strengths in the water chain with the Rijnland District Water Control Board. The municipality of Noordwijkerhout already has over ten years of experience with this. The collaboration has quality, cost, expertise and continuity advantages.

We share our innovations, knowledge and expertise with other interested parties through symposia, publications and education. We share our experience in the field of water and nature with international partners. And we share our knowledge with water companies in developing countries.

In addition to its involvement in water projects abroad Dunea also supports social projects and organisations in the Netherlands. Examples include our sponsoring of the Waterzaal in the Museum in The Hague and Corpus in Oegstgeest where visitors can take a journey through the human body. Together with Corpus we want to make young people and adults more aware of the relationship between drinking tap water and health. In the Medical Info Centre visitors can take a virtual cycle ride through our dunes and improve their knowledge about drinking water through a quiz.

More information is available at www.dunea.nl.



At the beginning of 2014 Dunea will move to a new head office on the Plein van de Verenigde Naties in Zoetermeer. Until then we can be visited at:

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