

CITY OF ROTTERDAM
DUTCH DELTA WATER BOARD
HIGHER WATER BOARD OF SCHIELAND AND KRIMPENERWAARD
HIGHER WATER BOARD OF DELFLAND



WATER PLAN

WORKING ON WATER FOR AN ATTRACTIVE CITY

Rotterdam



2007

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WATER PLAN 2 ROTTERDAM

‘Water Plan 2 Rotterdam’ outlines the water management objectives of the City of Rotterdam and the water boards for the next few years. These objectives need to be set out in specific terms, especially in view of the increasing evidence of climate change. Climate change can have a dramatic impact on Rotterdam. In order to make the city ‘waterproof’, a new approach is required in terms of water storage, water quality and flood protection.

The implementation of the previous Water Plan is still in progress, but it required adjustments due to the many new developments and insights. The views of the current plans concern the period up to 2030. This due to the fact that the City Vision also looks ahead to 2030. In the City Vision, the municipal administration states what it has in mind for Rotterdam: a city with a strong economy and an attractive place to live. This development and all the measures contained in this Water Plan are closely connected.

Plenty has been done in recent years. Extra surface water areas were created in the revamped *Zuiderpark*, increasing the storage capacity. The banks were redesigned, the ecology has improved and the park now offers more space for recreation. Canals and brooks in the north and south areas were cleaned up and the quality of the water here has improved tremendously. The *Bergse Plassen* have been spruced up, so that the water is now clean and clear again. Other big projects are still under way. Furthermore, the municipal authority is busy implementing the measures as mentioned in the Municipal Sewerage Plan.

THE TRIALS AND TRIBULATIONS AHEAD OF US

Rotterdam wants to realize a strong economy and an attractive residential environment. Water is an important aspect of an attractive city, certainly one that claims to be a ‘water city’. The vision of Rotterdam for the future plays an important role in all of the plans. In addition, we will or may have to face three crucial developments in the next few years.



- Higher water levels due to rising of the sea level. Risks of flooding arise in areas outside the levees. Water defences will simply have to be reinforced.
- Flooding due to increased precipitation. Climate change can cause a lot of rain to fall in a short space of time. Discharge of this water requires provisions for collection and storage. The current need for storage already surpasses the capacity by some 600,000 m³. At least 80 hectares of extra lakes and canals would be needed to cope with this shortage by means of surface water areas.
- Stringent standards for the quality of water. Rotterdam wants to be an attractive water city, with clean, clear water, rich in flora. Moreover, the city has to meet European requirements (the European Framework Directive on Water). So-called quality profiles, based on these requirements, are in the process of being drawn up for all stretches of water in the city.

DECISIONS OF ESSENTIAL IMPORTANCE

In order to solve the problems referred to above, choices have to be made. These are the so-called 'decisions of essential importance'.

PROTECTION Rotterdam needs to be protected against flooding, both inside and outside the levees. All quays and levees that are not yet high enough, according to the current standards, will be reinforced in the next few years. But in the longer term, the city will have to be protected as well. For this reason, space needs to be reserved now to be able to reinforce the water defences in due course. This does not mean

that these levees will form massive barriers between different areas. Water managers and urban planners will join forces to use them, where possible, as connecting elements, as park landscape elements, balconies on the *Maas* or promenades and cycle paths. Constructions outside the levees in the Rotterdam region will have to include provisions for higher water levels in future in the design itself, in a so-called adaptive approach. In short: measures have to be taken now, even though their effects will only manifest themselves in the long run.

CLEAN WATER 'Clear water, rich in flora' is the general objective for the water in Rotterdam. The right mix of measures will ensure that this goal is feasible for almost all stretches of water in the city.

ATTRACTIVE CITY Perhaps the most important decision concerns the question as to how the city's appeal can further be enhanced as a place to live, work, study and spend leisure time, while at the same time solving the water management issues. Traditional solutions are inadequate. In the city centre and the old neighbourhoods, for example, it isn't possible to tackle the problems of water storage by digging extra facilities. The costs are exorbitant and existing buildings can't simply be demolished. Innovations such as green roofs, water plazas and alternative forms of water storage are, therefore, essential for the further development of the city.

SEWERS In practice, rainwater is usually discharged through the sewers. An increase in precipitation will lead to problems with the existing sewerage system. One possible way of avoiding these problems is to collect the rainwater and to separate the discharge of dirty waste water from the relatively clean rainwater discharge. This separation, however, should in no way affect public health, the quality of the groundwater or the groundwater levels. It is far from easy to reconstruct Rotterdam's sewerage system. Sewer pipes last around fifty years; the reconstruction will, therefore, take several decades. According to a recent social cost-benefit analysis, complete separation throughout Rotterdam would not be the best solution. For this reason, different approaches are devised to meet the specific needs of every individual area.



VISION OF ROTTERDAM WATER CITY 2030



GENERAL

- residential areas
- new residential areas
- ribbon developments
- industry and business parks
- parks and woods

RIVER CITY

- existing housing outside the levees
- new development outside the levees
- levee as levee
- levee as urban balcony
- existing levee as urban balcony
- industry and business parks outside the levees

NORTH

- drainage pools and canals
- water plazas
- green roofs
- water gardens
- (new) areas for nature and recreation

SOUTH

- canals in Oud-Zuid
- water plazas in Oud-Zuid
- green roofs in Oud-Zuid
- water plazas in the garden cities
- water jewel Zuiderpark
- surface water connection Zuiderpark-Carnisselande
- temporary water collection

HOOK OF HOLLAND

- water collection via infiltration Watercentrum West
- collection of excess water
- new areas for nature and recreation



PERSPECTIVE ON ROTTERDAM WATER CITY 2030

The plans for Rotterdam Water City 2030 consist of enhancing existing qualities and responding cleverly to new developments. While the previous chapter was all about choices to be made, the present one addresses the consequences of these choices, divided into three main areas.

RIVER CITY River City roughly consists of the area outside the levees. The key feature of River City is the *Maas*, the trademark of Rotterdam, the city's lifeline. The river connects the port – the driver of the economy – with the hinterland. Rotterdam has a characteristic waterfront, featuring the *Kop van Zuid*, the *Lloydkwartier* and new construction sites, offering space for a wide range of dynamic residential and commercial areas. At the same time, the river provides opportunities for more transport by water to reduce travel time and improve the accessibility of these areas. Furthermore, this type of transport offers Rotterdam a chance to enhance its image. A recreational route can be created along the length of the river, connecting a vast array of unique spots, which together form the city's largest recreational area.

ROTTERDAM-NORTH The northern banks are the scene of many highly popular residential and commercial areas: most of the centre, *Kralingen*, *Blijdorp*, *Hillegersberg*, and *Alexander*. Water makes a massive contribution; living alongside the water is very popular. The aim for this part of the city is to continue to enhance these existing qualities.

Rotterdam-North has '*boezems*' (storage basins) and canals which serve as water storage, but the sewerage system accounts for a large part of the storage. The strategy is to reinforce the canals and *boezems* and extend them where possible, and to use innovative solutions when space is in short supply, such as in the city centre and the old districts.

ROTTERDAM-SOUTH The South requires an unconventional approach. That's because the problems are not run of the mill either. There are exceptional opportunities here, however. The South is an area rich in water, with its (inner) ports and possible water connections. The water could be put to even better use, but that would mean encroaching fundamentally on the urban area. Possibilities include the reinforcement and extension of the water structure from within the *Zuiderpark*; creating new water networks using existing and new canals, watercourses, the *Zuiderpark* and the districts earmarked for restructuring; and, finally, connecting the South to the surrounding area by means of a new north-south link.

REALIZATION STRATEGY

A strategy is needed if the water plans are to be achieved, consisting of priorities (the projects that definitely have to be realized in the next few years) and phases (which measures should be taken and when).

Basically, there are three types of measures.

- Improvement of the water system: What can we do to benefit safety, to combat flooding and to improve the quality of the environment?
- Enhancing the urban quality: How can we link Rotterdam's development plans to what needs to be done in terms of water management?
- Implementation of innovative and alternative solutions: What will we do if the traditional approach fails?

For the purpose of prioritizing, a list of criteria was drawn up. What is important, for example, is whether a project is already in progress, how it contributes to the solution of water management problems, how it contributes to enhancing the city's appeal, whether there is a 'now-or-never' situation and whether it can serve as a model.

IMPLEMENTATION PROGRAMME The Implementation Programme 2007-2012 sets out what needs to be done in the next five years. This involves ongoing projects from the first Water Plan, new projects, and studies that are already being conducted so that we can carry on quickly after 2012. They can be subdivided into safety projects, projects to realize water storage, and projects to improve the water quality.

SAFETY The safety aspect involves two main themes: the levees and construction work outside the levees. The starting point is to ensure permanent flood protection for the city. In the longer term, choices will have to be made concerning the storm-surge barrier and the required height of the levees.

During the implementation phase of the present Water Plan, those sections of the levees that do not yet meet current standards will be reinforced. The water defences at the *Vierhaven* and *Merwehaven* also require attention. Following detailed testing, a study can be launched into adaptive building in this port as well as in the *Rijnhaven* and *Maashaven*. For the areas outside the levees, the fullest account must be taken of the risks of flooding. New construction projects and area landscaping need to include provisions to control these risks, evacuation must be possible and communication with citizens is a prerequisite. Studies into these aspects are on the agenda for the next five years.



QUANTITY OF WATER In the next few years, Rotterdam will have to store more rainwater than it does now. The Municipal Sewerage Plan already contains many relevant measures. Another approach is to create more space for surface water. This is possible particularly in the neighbourhoods earmarked for restructuring. Examples include *Groenehagen/Tuinhoven*, *Hordijkerveld*, the northern part of *Lombardijen* and *Oedevlietsepark*. If there is little or no space, we will have to focus on innovation and alternative ways of retaining water. Examples are wadies, water gardens, water plazas and green roofs. There are pilots in the pipeline for the latter two examples. In addition, solutions are investigated for the problems anticipated in the city centre, *Oude Noorden*, *Crooswijk*, *Overschie* and *Oud-Zuid* and the industrial estates *Spaansepolder* and *Noordwest*.

QUALITY OF WATER Rotterdam and the water boards aim to improve the water quality by 2015. This aim is prompted, on the one hand, by the fact that Europe has imposed directives to this effect, but another motivating factor is the fact that surface water can be used for a variety of purposes, that it is perceived to be of higher quality, and that its economic value is higher. A completely clean water system within ten years is not feasible, however. It costs a lot of money and the effects of measures are often only visible in the longer term. We have therefore



▶ 2030

chosen to prioritize. Thanks to a special system of water quality profiles, we can choose measures which are practicable, technically feasible and affordable. We apply this approach particularly in the submunicipal water plans. Apart from this, the watercourses that are not yet being tackled in this way have to meet certain minimum requirements to ensure that floating rubbish, odour nuisance and fish mortality is reduced to a minimum. In addition, a study will be conducted into possibilities for fish migration and a comprehensive plan for the fish stock, with a focus on the ecological value of the waterways.

To ensure that the basic principles of the Water Plan are actually implemented, also at an organizational level, several activities will be held shortly to secure tight collaboration between the City of Rotterdam and the water boards, and between water management experts and urban planners.

All of these efforts will finally result in the ambitious Implementation Programme 2007-2012, containing a detailed description of the projects.

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Water and Rotterdam are inextricably intertwined. Water forms an essential part of the city and plays a crucial role in its development. The rivers Maas, Schie and Rotte, the many canals and lakes, and the docks are characteristic features of the city of Rotterdam. The water networks are under pressure and we have reached the very limits of how far we can go. The climate is changing. The threat of greater quantities of water confronts us from four different angles – from the sea, the rivers, the air and the ground.

What will be the impact of all this on Rotterdam? How can the different ways of coping with all the extra water be used to make the city more attractive? Water Plan 2 Rotterdam describes how the City of Rotterdam and the water boards intend to approach water management in the city in the years ahead, taking into account the spatial developments, which are inextricably linked with the need to accommodate the extra water. The basic principle presented in Water Plan 2 Rotterdam is that these components can actually reinforce each other. The three main themes in this respect are: flood protection, water storage and water quality.

For more information, please visit www.waterplan.rotterdam.nl.

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