



**Communication on progress  
United Nations Global Compact  
and  
Corporate Social Responsibility  
at Witteveen+Bos 2007**



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The Quality management system of Witteveen+Bos has been approved to ISO 9001 : 2000

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## **1. STATEMENT OF CONTINUOUS SUPPORT**

Witteveen+Bos continues to carry out the commitment to be a good corporate citizen and to create value for the societies in which we work.

In 2007, employees from across our company participated in the update of our mission, vision, goals and strategy programme. Our employees indicated that being a good employer for over 700 people and contributing to sustainable solutions in (the Dutch) society are the main issues concerning social responsibility for the company. Besides these two issues, honesty, integrity, social responsibility expertise and an organisation in which people have the opportunity for (self-)empowerment and -development, were named by employees as key characteristics of the company.

We consider the most important developments to be internationalisation, changing roles in the sector, changes in the labour market and the development towards a more sustainable society. Our mission and vision were reformulated and our objectives and strategies were detailed in operational plans.

UN Global Compact provides a set of principles, which stimulate our progress on Corporate Social responsibility. Our progress against the ten UNGC Principles is summarised in the table below. As required by the UNGC's rules on Communications on Progress (CoP), we endeavour to describe through our new mission and vision, this report, our practical actions and partnerships to implement the Global Compact principles.

This year's report focuses on the issues that are important to our business and relevant to our stakeholders and readers. Besides the statement of continuous support, a summary of key actions on progress, a clarification of our updated vision and key figures, we have identified highlights concerning environment and sustainable development initiatives and tools. In a separate subsection we communicate our targets and intentions for the year 2008.

August 2008, H.E. Nieboer, director

## 2. UN GLOBAL COMPACT COMMUNICATION ON PROGRESS

UN Global Compact principles	key actions on progress
1. Businesses should support and respect the protection of internationally proclaimed human rights.	Our Code of Conduct states that 'Assignments in contravention of national and international law and rules will not be accepted'. In this way we support and respect the protection of internationally proclaimed human rights.
2. and make sure that they are not complicit in human rights abuses.	Complicity in human rights abuses has not been reported in 2007. However, procedures for monitoring and reporting human rights abuse are not in place yet. Our company intends to introduce such procedures in 2008.
3. Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining.	Witteveen+Bos is an employee owned company. Through shareholders meetings, the employees have influence on the company's policy. Furthermore, employee involvement is guaranteed through the Personnel Council. The Personnel Council (PC) looks after the interests of all Witteveen+Bos employees. Further information can be found on page 7.
4. Business should support the elimination of all forms of forced and compulsory labour.	Our Code of Conduct prohibits these forms of labour in our operations. Witteveen+Bos endorses the ILO Declaration on fundamental principles and rights at work.
5. Business should support the effective abolition of child labour.	
6. Business should support the elimination of discrimination in respect of employment and occupation.	In 2007 Witteveen+Bos gave a commitment to work actively on appointing more women to managerial positions in 2008. This process is monitored and results will be communicated at the end of 2008. Further information can be found on page 7.
7. Business should support a precautionary approach to environmental challenges.	Finding answers to environmental challenges is one of the core activities of our company. We stimulate innovative technologies and approaches and enhance partnerships. We provide our clients with unsolicited advice on environmental friendly alternatives in investment projects. In 2008 our company intends to introduce a sustainability plan for projects. Further information and examples can be found in session 6. Highlights (page 12-18).
8. Undertake activities to promote greater environmental responsibility.	
9. Encourage the development and diffusion of environmentally friendly technologies.	
10. Work against all forms of corruption, including extortion and bribery.	We will not engage in bribery and will not accept an assignment which has been assigned to us on dubious grounds. We reject payments which can influence our objective and socially responsible approach. For our employees we have developed an Integrity Game, that confronts them with dilemma's and solutions to those dilemma's. A reporting system concerning corruption and bribery for employees is in place. In 2007 no incidents were reported.

### **3. COMPANY PROFILE**

Witteveen+Bos is a company based in the Netherlands providing consultancy and engineering services for projects in the areas of water, infrastructure, environment and economics using a multidisciplinary project approach, meaning that specialists from various disciplines work together to solve complex problems.

Clients of Witteveen+Bos are governmental, commercial, and industrial, including various types of joint ventures and public private partnerships.

The company has eight offices in the Netherlands and four offices abroad. Internationally works in many countries in Africa, Asia, South America, Europe, Eastern-Europe, Central Asia and the Middle-East.

Witteveen+Bos have 750 employees. These employees are shareholders in the company through an interesting participation system. Witteveen+Bos are a fully employee-owned firm.

All employees on a permanent contract can participate as shareholders on the level of participant, partner or senior partner. The degree to which they can participate depends on their position and the number of years with the company. Twelve percent of the shares is available for the participants. About 366 of our employees participate. For partners 20.3% percent of the shares is available. This participation is intended for the key members of the personnel. The board of directors nominates the candidates while the general shareholders' meeting approves. At the moment there are 67 partners. Finally there are 22 senior partners holding 67.7% of the shares. They also are nominated by the board of directors and appointed by the general shareholders' meeting.

Witteveen+Bos are in the Top Ten of Dutch consulting engineering companies and have been nominated as one of the best companies of the future according to the latest report of the Organisation for Investigating Top Companies.

Through its work the company wishes to contribute to the development of society, feeling responsible for the provision of reliable solutions for technical and social problems. Witteveen+Bos have their own code of conduct.

The Witteveen+Bos organisation is arranged into independent product-market combinations (PMCs). Each PMC focuses with its own products on a specific market segment. The PMCs also cooperate regularly in integral, complex projects. The PMC mix was optimised in 2007 and the number of PMCs was increased to 21.

In the Netherlands, Witteveen+Bos has its head office in Deventer plus offices at Almere, Amsterdam, Breda, The Hague, Heerenveen, Maastricht and Rotterdam. Outside the Netherlands we maintain offices in Indonesia, Kazakhstan, Latvia and Russia and have project offices in Serbia and Romania.

## **4. VISION, VALUES AND STRATEGY**

### **4.1. Mission, vision and corporate values**

Witteveen+Bos offers its clients valuable advice and high-quality designs in the areas of water, infrastructure, the environment, spatial development and construction. Through its employees' knowledge, experience, intelligence and social insight, the company produces reliable solutions. Witteveen+Bos provides an exciting and inspirational working environment and addresses fascinating challenges for the future. Professionalism, respect and integrity are our hallmarks.

Witteveen+Bos wants to be a top-class consultancy and engineering firm. To achieve this it is essential to have an international orientation on products, markets and the labour market. Integrity, flexibility and networking capabilities will be essential in achieving this vision.

Witteveen+Bos wants to retain its identity and independence and to be recognised as a high-quality organisation. Witteveen+Bos wants to operate in the top of the market and to be an attractive organisation where professionals can develop themselves. Our continuity is assured by good financial and non-financial results.

As an independent consultancy and engineering firm, Witteveen+Bos is engaged by authorities, semi-public authorities, water boards and the business community. Governments are concentrating on their core tasks and leaving more and more to private parties. Through its independent position Witteveen+Bos is able to adopt various positions, both on the side of the government and on the side of private parties.

We act with professionalism, integrity and respect for our clients, partners and employees. The ambition to have value for society and develop ourselves professionally, is what drives us.

### **4.2. Strategies and policies**

Witteveen+Bos attaches importance to long-term relationships with its clients, partners in projects and employees. Social commitment and care for mankind and the environment are central considerations in the projects we take on.

We pursue sustainable solutions. Besides our work we make contributions to the society and environment in which we live and work. Witteveen+Bos was the first engineering firm in the Netherlands to commit to the United Nations Global Compact. Through this commitment we endorse the UN's principles concerning human rights, the environment and integrity.

### **4.3. Updating our strategy**

To maintain our position at the forefront we continually look for improvements to remain an attractive firm for employees, clients and partners in projects. Following on from our long-term scenario studies in 2002, we completed our mission, vision, goals and strategy programme in 2007. Employees from across the company participated in this programme in broadly based groups.

We consider the most important developments to be internationalisation, changing roles in the sector, changes in the labour market and the development towards a more sustainable society. Our mission and vision were reformulated and our objectives and strategies were detailed in PMC (product-market combination) plans.

## 5. PROGRESS, MEASUREMENTS AND RESULTS

### 5.1. Financial highlights

Witteveen+Bos was founded in 1946. The first project was the construction of the Prins Bernhard lock in Deventer. A lot has happened since then and Witteveen+Bos is now one of the top ten engineering firms in the Netherlands. A characteristic of our company is that we have achieved that position entirely through organic growth.

Witteveen+Bos is a financially sound company, as is clear from the following financial indicators for the past five years:

**Table 5.1. Financial indicators Witteveen+Bos 2003-2007**

	2007	2006	2005	2004	2003
turnover	91,214	82,202	80,833	72,606	67,921
salaries and social security payments	38,650	35,006	34,261	32,637	32,628
result before taxation	14,692	12,631	11,779	11,153	7,578
result after taxation	10,841	9,439	8,361	7,369	5,031
cash flow	12,355	10,784	9,649	8,930	7,145
net investment in tangible fixed assets	1,588	1,299	1,183	559	948
depreciation of tangible assets	1,514	1,345	1,288	1,561	2,114
number of staff (not consolidated)	708	661	661	654	649

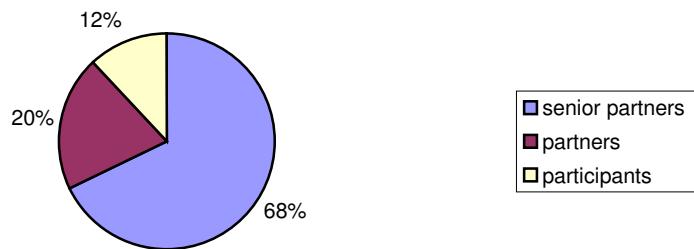
(amounts in thousands of euros)

### 5.2. Employees

#### employee participation

Witteveen+Bos is a fully employee-owned firm. Our unique participation system enables employees to participate as shareholders on the level of participant, partner or senior partner. All our employees on a permanent contract can participate. The degree to which they can participate depends on their position and the number of years with the company. The financial participation system of Witteveen+Bos is very vital and provides an important stimulus for the commitment and entrepreneurship of our workforce. The level of participation is almost 75 %. As of 1 July 2007 the senior partners (22) hold 67.7 % of the shares, the partners (67) 20.3 % and participants (366) 12.0 %. The internal price of the Witteveen+Bos share stood at EUR 4.52 at 1 July 2007.

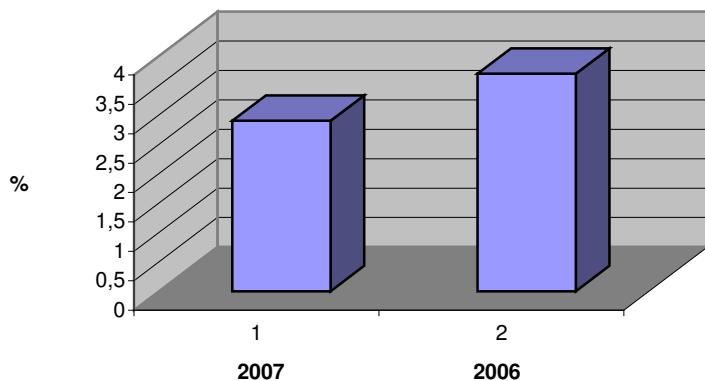
**figure 5.2.1. Employee participation, overall participation level 75 %**



#### **sick leave rate**

Thanks to less long-term sick leave and extra attention to overseeing absenteeism, the sick leave rate of 2.9 % was significantly lower than in 2006 (3.7 %). There were no serious accidents at work, although there was a serious road traffic accident with personal injury. We have intensified the attention given to safe working practices, among other things by means of toolbox measurements, health & safety courses and workplace inspections.

**figure 5.2.2. Sick leave rate Witteveen+Bos**



#### **satisfaction**

Employee satisfaction is measured at Witteveen+Bos through a periodical employers health survey (PAGO; Periodiek Arbeidsgezondheidkundig Onderzoek). Part of the survey is the examination of the employee satisfaction. Besides this information we think that the average number of years within the company can serve as indicator for employee satisfaction. With a strong influx of young employees in 2007, the number of years of service currently averages 8.8.

#### **commission moral behaviour**

Witteveen+Bos has a policy to prevent (sexual) harassment and bullying at work and solve these situations. In the handbook on regulations it has been described what an employee can do if he/she is confronted with harassment at work.

Consulting an (external) expert and filing informal or formal complaints are some of the options.

#### **gender**

Women account for 24 % of the workforce and men 76 %. Little women occupy managerial positions.

Witteveen+Bos participates in Bouwnetwerk, a Dutch national network for women who are involved and interested in issues relating to the built environment. It is aimed at women who work in the built environment professions or the construction industry. Bouwnetwerk provides useful support, provokes stimulating debate and discussion and is also fun. In 2007 Witteveen+Bos gave a commitment to work actively on appointing more women to managerial positions in 2008. Bouwnetwerk is keeping a sharp eye on this process. At the end of 2008 results will be communicated in a Bouwnetwerk meeting.

### **neWBie**

The neWBie group was created in 2005. It is an internal network that helps the integration of new employees. Employees who have been with the firm for not more than three years can join neWBie. Its objectives are to enlarge the internal network, encourage new initiatives and accelerate integration. Steps in 2007 included an integration game and a speed dating meeting.

### **development of employees**

Witteveen+Bos successfully applies a formula of recruiting and training recent graduates. The development of employees makes Witteveen+Bos a lively and learning organisation. Personal development needs to be focused on proficiency, entrepreneurship and reinforcement of teamwork and internal cooperation. We stimulate this by offering a wide range of internal training courses: 455 persons attended 42 internal courses in the year under review. Our employees also took many external courses of a more specialised nature. We have introduced e-learning and have evaluated and improved our project management courses.

### **the Personnel Council**

The Personnel Council (PC) looks after the interests of all Witteveen+Bos employees and can consist of maximum thirteen 13 members who are elected from and by all sectors and PMCs.

The PC discusses with the Executive Board of Witteveen+Bos concerning the company's policy to pursue. Very several subjects are taken into consideration such as posting regulations, travel expenses, career policy, sickness absence, etc. Both the OR and the Executive Board can submit proposals to change or evaluate the existing company policy.

The rights and duties of the company and the Personnel Council have been laid down in the law on personnel councils (Wet op de Ondernemingsraden). In some cases, like for example Occupational Safety and Health issues and several labour agreements, proposed policies can only be carried out if both the Executive Board and the PC have reached agreement. The remaining labour agreements have been established in consultation between the Executive Board and the PC.

## **5.3. Environment**

### **environmental impact assessments**

Large scale infrastructure and building projects require the assessment of their impacts on the environment. Witteveen+Bos prepares environmental impact statements for projects ranging from highways, railroads and ports to industrial complexes, urban extension and solid waste dumping and treatment sites. Witteveen+Bos is familiar with the special procedures and formats for environmental impact assessments.

### **environmental audits**

Environmental audits are carried out for industries, in order to meet legal requirements and to assess energy saving potentials and pollution prevention measures. Witteveen+Bos co-operates with accountants' firms and is responsible for the technical aspects.

## **environmental permitting and legislation**

Witteveen+Bos assists industries and other private sector companies in obtaining environmental permits. On the other hand governmental organisations are assisted in the assessment and evaluation of applications for environmental permits.

## **process technology**

Consultancy services are provided to industries with regard to process technology, in order to improve performance and efficiency. Special attention is given to pollution prevention, recycling and meeting environmental standards.

## **air pollution control**

The Netherlands is the most densely populated country in Europe, with associated problems of air pollution by agriculture, traffic and industries. Witteveen+Bos monitors air quality and provides advice on air pollution abatement and prevention. Sophisticated modelling techniques are employed for that purpose.

## **odour nuisance abatement**

Olfactometry, the science of measuring odour nuisance, is a special expertise of Witteveen+Bos. The results of odour nuisance surveys are used in order to provide advice on prevention and mitigating measures. Special computer programmes predict the odour levels at varying distances.

## **noise pollution control**

Witteveen+Bos have noise survey teams that measure noise levels as a result of industrial activities, road, rail and air traffic (emissions). Computer models are used to assess the noise emission levels at sensitive locations. Consultancy services are provided with respect to how to cope with noise pollution.

## **safety, health and environment (SHE) management**

Industries have their own safety, health and environment management programmes. Witteveen+Bos assist industrial clients with building up databases, measuring and monitoring programmes, formulation of SHE-programmers. The added value is that Witteveen+Bos is familiar with the legislation and regulations that industries have to conform with.

## **soil and groundwater contamination assessment and remediation**

Based on soil and groundwater pollution measurements, computer modelling of propagation of pollutants gives insight in the extent of the contamination problem. Besides pollution, also salt-water intrusion in aquifers can be modelled. Assessment of the impacts of soil and ground water contamination is followed by advice on remediation measures.

## **solid waste (municipal and industrial) management**

Witteveen+Bos designs dumping sites for municipal and industrial waste, using soil and ground water pollution modelling techniques. Advice is given on solid waste collection, separation and processing. Furthermore Witteveen+Bos has experience with capacity building for solid waste processing organisations.

## **environmental risk analysis**

In order to assess the degree of environmental impacts of infrastructure and building projects, often an environmental risk analysis is required. Special techniques have been developed to assess the risks for the physical and biological environment.

## **ecology and preservation**

There is a growing awareness to shift away from end-of-pipe-solutions to prevention and control. This requires expertise in the field of ecology, (hydro-)biology and nature preservation rather than engineering. Witteveen+Bos can also provide these expertise for multi-disciplinary project teams.

### **flora and fauna**

For environmental impact assessments expertise on flora and fauna is necessary, but at the same time techniques to quantify these impacts. Witteveen+Bos provide such expertise.

### **bioassays and biomanipulation tests**

The European Water Framework Directive calls for defining the ecological potential of water bodies. Bio-assays can support in determining the (hydro) biological quality of the waters. Living organisms are used to determine pollution levels, because these are a more direct measure for water pollution than chemical parameters.

### **physical and chemical laboratory analyses**

The consultancy services of Witteveen+Bos also include supporting physical and chemical laboratory testing. These laboratory tests are subcontracted to specialised laboratories. Witteveen+Bos co-ordinates, assesses and interprets the tests.

### **5.4. Safety**

Within Witteveen+Bos a working group on Health & Safety (H&S) is operative. The activities of this group aim to enhance knowledge of Health & Safety legislation and regulations within the company. The group publishes the Handbook "Health and Safety in the Design Phase". The H&S group pro-actively advises employees in drafting H&S plans, providing a basic H&S training course, answering questions on all H&S topics concerning Health & Safety in project design and implementation phases.

### **VCA**

The VCA (Veiligheid, gezondheid en milieu Checklist Aannemers) was originally developed to certify companies who service the (petro) chemical industry on their Health and Safety policies. Witteveen+Bos and associated companies apply these health, safety and environmental checklist standards for contractors, for operational services.

### **5.5. Quality**

A personal relationship with our clients, short lines of communication, obtaining maximum benefit from each other's expertise –this is how we realise our ambition: providing our clients with integrated solutions for complex problems. This approach has lead to an accessible and transparent organisation structure.

Our 750 employees are grouped in Product Market Combinations, each PMC offering its own products for specific market segments. Close cooperation between the PMCs ensures an integrated approach to problems. Thus we can offer our clients modern, innovative and market-oriented services. Our PMCs are grouped into five divisions: Water, Space and environment, Urban Infrastructure and traffic, Ports and hydraulic engineering and Hydraulic infrastructure. They are supported by staff departments, including Finance and Administration, Personnel and Organisation, Legal Affairs, Quality Systems and General Affairs.

The quality management system of Witteveen+Bos is laid down in the company's Quality Manual. This manual has been compiled in compliance with the ISO 9001 and VCA 2004/04 standards and with the company's environmental rules.

The HR&O department distributes the Dutch version of the Quality Manual to all employees of Witteveen+Bos. The English translations can be obtained from the secretary of the international affairs co-ordination group.

The application of the quality system in the line organisation and in projects is monitored through internal audits.

## **ISO 9001**

ISO 9001 is a quality management system that includes a set of procedures that cover all key processes in the business, monitoring processes to ensure they are effective, keeping adequate records, checking output for defects, with appropriate corrective action where necessary, regularly reviewing individual processes and the quality system itself for effectiveness, and facilitating continual improvement.

Certification to an ISO 9000 standard does not guarantee the compliance (and therefore the quality) of end products and services; rather, it certifies that consistent business processes are being applied. Witteveen+Bos applies ISO 9001 standards for all consultancy and engineering services.

## **5.6. Company Code and awareness**

### **company code Witteveen+Bos**

The company code of Witteveen+Bos is operative since 1998 and contains the following key elements: mission and key values, responsibility towards society, clients, partners, colleagues within the engineering branch and within the company, quality, good governance, business cultures and implementation & improvement of the company code.

### **awareness**

Global Compact principles and the fact that Witteveen+Bos subscribe these principles was described in the internal newsletter Witteveen+Bos in Dutch and English.

Also, a number of shareholders/employees of the company have put the issue of Corporate Social Responsibility at the agenda for the upcoming internal company policy debate ('policy days'). According to the company code, Witteveen+Bos employees can discuss specific integrity issues with a special integrity committee. Besides, Witteveen+Bos have developed a integrity game, addressing potential dilemma's for the company's employees in order to implement the key values in the company's operations.

## **5.7. Principles subscribed and certificates obtained**

### **global compact**

Witteveen+Bos were registered as a participant of Global Compact, and thus subscriber of the Global Compact Principles, in 2005. Participation in Global Compact was a compulsory in order to be able to tender for a United Nations project in Indonesia. The company registered as a participant, but did not realise at that time that a report or communication on progresses was due annually. The report (Communication on Progress) was submitted and the company accepted as participant.

The initiative was taken by the management; the reports are also submitted by the management (Executive director and his secretary). The employees know about the participation in Global Compact through the company's internal newsletter.

The main issues concerning the Global Compact Principles are reflected in the company code. Witteveen+Bos are the first and until now only engineering company in the Netherlands that has subscribed the Global Compact principles.

### **ONRI code of conduct**

The ONRI Code of Conduct is a code for engineering companies and consultants in the field of engineering. Membership of ONRI obliges a member to be independent and avoid potential conflicts of interest, to be aware of the importance to society and development of the (human) environment, to closely follow new developments in technology, to accept orders and perform services only if professional capacity to perform the task, confidentiality and compliance. The ONRI can impose sanctions on its members if its principles are not observed.

## **FIDIC**

The International Federation of Consulting Engineers (the acronym stands for the French version of the name) represents globally the consulting engineering industry. As such, the Federation promotes the business interest of firms supplying technology-based intellectual services for the built and natural environment.

The International Federation of Consulting Engineers recognises that the work of the consulting engineering industry is critical to the achievement of sustainable development of society and the environment. All member associations of FIDIC subscribe to and believe that the following principles are fundamental to the behaviour of their members if society is to have that necessary confidence in its advisors. Key FIDIC principles are:

Responsibility to society and the consulting industry, competence (maintain knowledge and skills and perform services only when competent to perform them), integrity and faithfulness, impartiality (be impartial in the provision of professional advice, judgement or decision and avoid any potential conflict of interest that might arise in the performance of services to the client), fairness to others and anti-corruption (neither offer nor accept remuneration of any kind which in perception or in effect either a) seeks to influence the process of selection or compensation of consulting engineers and/or their clients or b) seeks to affect the consulting engineer's impartial judgement and co-operate fully with any legitimately constituted investigative body which makes inquiry into the administration of any contract for services or construction).

## **OECD Guidelines for Multinational Enterprises**

The Guidelines cover the range of MNE activities. Specific chapters deal with general policies, information disclosure, competition, financing, taxation, employment and industrial relations, environment and science and technology. Both the chapters on general policies and on employment and industrial relations contain clauses that are relevant in relation to enterprise closures.

## **6. HIGHLIGHTS**

Witteveen+Bos has a pro-active approach in development of sustainable solutions. We focus on innovation by combining technical, social, environmental and economic aspects of the work of engineers. We are proud to present the following highlights, which illustrate our commitment to and perception of responsibility for sustainable development.

### **6.1. Sustainable area development**

Territorial development is an integrated and proactive approach to shaping the future of cities, regions and larger geographies – to some degree it can also be referred to as spatial planning. It goes beyond traditional regional policy as it brings together economic, social and environment opportunities and concerns as well as other factors which influence where activities takes place, how different places function and are connected, and what conditions are offered for living and doing business.

Sustainable area development strategies can help exploring potentials for economic growth and jobs and at the same time support an enhanced quality of live by helping to meet the challenge of sustainable development. Environmental impact assessments, social cost/benefit analyses and perception studies often support this process. The final step is often the granting of permission under public law in the form of licenses and exemptions. Witteveen+Bos is regularly engaged to work on all aspects of area development.

Witteveen+Bos advised the provincial government of North Brabant on the choice of location for a business park. Within the confines of a plan EIA, it was possible by using GIS and assigning weightings to substantiate the choice of the most sustainable location. Another example is the perception survey conducted for a possible landing point for a gas pipeline in the province of North Holland.

Witteveen+Bos frequently uses social cost/benefit analyses to assess whether investments in developing an area are socially responsible. A social cost/benefit analysis is in fact the most appropriate way of testing sustainability. These analyses are also used as a tool to optimise the layout of an area.

#### **6.1.1. Wieringerrandmeer**

The project Wieringerrandmeer contains all component of sustainable area development. This plan is a pilot project for development planning. An integrated environmental impact assessment, a combination of strategic environmental assessment, agricultural impact assessment, nature conservation check, social cost-benefit analysis and socio-economic impact study, together with the civil-engineering designs and water management calculations, will form a solid basis for further decision-making. Water is the determining factor in planning this major redevelopment project at the top of the province of Noord-Holland.

**figure 6.1.1. Sustainable area development at Wieringerrandmeer**



### **6.1.2. 't Duyfrak, Valkenburg**

The project known as 't Duyfrak is an enormous development location between the cities of Leiden and Katwijk, with six sub plans and plans for a total of 800 new homes and twelve bridges. Witteveen+Bos used the 'Better Site Preparation +' and 'Concurrent Engineering' concepts to achieve a sustainable development location quickly. Until recently 't Duyfrak was a 40 ha site of obsolete glasshouse horticulture. Now it is being turned into a new residential district. Building a new residential district in a short time on a wet, subsiding soil poses technical and logistical challenges. In order to lose no time, the urban planning design, civil engineering process and spatial planning process moved forward in unison. This created a design process in which these different disciplines cooperated integrally and interactively. The first houses will be completed in 2008. The integral design process will then have provided the basis for a fast and smooth construction process and a substantial reduction of costs and risks.

The concept 'Better Site Preparation +' is the art of finding the optimal solution, taking into account wishes and interests of all stakeholders and aiming to reach the highest social benefit against for lowest social cost, now and in the future. The Concept 'Better Site Preparation +' has been developed by Witteveen+Bos to prevent problems, such as sags, splitting walls and water hindrance, often occurring after the building process. Cheap approaches to integral heightening of locations for new housing have negative impacts on settings. The 'Better Site Preparation +' concept prepares a stable layer for building and a building location that is fully drained. Sewerage, cables and wires will stay in place.

The Duyfrak project has reached a high score on the IVAM analyses on sustainability profile for locations. The outcome of the analyses showed strong sustainability aspects in availability of water and green in the neighbourhood, restriction of odour pollution and soil pollution and water management.

### **6.1.3. Building with nature**

In 2007, Witteveen+Bos started to participate in the knowledge programme 'Building with Nature', in a cooperation with a number of companies, governmental departments, universities and other knowledge institutes. 'Building with Nature' aims to bring about a shift in the current design practice, from its defensive nature, focused on minimising negative impact on environment towards a new designing methodology and practice, focused on optimising the opportunities offered by natural systems.

Over 80 % of the world's large population centres are located in coastal, delta- and river areas. In the future this percentage will grow even higher. At the same time the demand for safety, quality of live,

welfare and sustainability will grow and climate will change. We can not respond to all demands without executing major infrastructure projects. Coastal zones need to be protected against the rise of the sea level, rivers need to be provided with more space, capacity of ports and waterways needs to be increased and functions of water systems combined. There is a need to retain and restore water and soil quality and make sustainable use of natural resources. Innovations in water engineering are necessary, especially in the field of smart use of nature's capacity and sustainable adoption of water engineering projects to the natural environment.: ecology and water engineering.

The mission of our 'Building with Nature' programme is to develop new, scientific underpinned, concepts for sustainable coastal-, delta- and river area development in such a way that opportunities offered by nature are utilised in an optimal way: ecodynamic area development.

## **6.2. Innovation in flood protection**

Together with Inventec B.V., Witteveen+Bos developed a real-time method for monitoring dikes. The D!kealert concept is based on fibre-optic technology and provides an early warning system over great distances. Unexpected or irregular movements in a dike body can be recorded online after which measures can be taken. D!kealert is in the running to be implemented and tested in 2008 at the Digidijk site in Nieuweschans.

In association with initiators Jansen and Vermond, Witteveen+Bos' plan for a float barrier won a competition organised by the Delfland Water Board for the development of an innovative, temporary flood defence. The float barrier consists of a concrete slab with a steel panel. The panel is raised by means of an EPS floater as soon as water flows into the concrete container.

## **6.3. Socio cost benefit analyses**

In the public decision making process, it is becoming less and less acceptable to spend tax payer's money on projects that do not clearly have significant socio-economic benefits. Although a bit late compared to other countries, the Dutch Government decided that Socio-economic Cost Benefit Analyses (SCBA) should be conducted prior to investment decisions in the year 2000. To ensure that SCBA's are executed similarly by different consultants, a national methodology for SCBA was introduced in the Netherlands in the year 2000. In this methodology impacts on nature, water, soil, landscape and cultural heritage were acknowledged as important aspects within SCBA, but their values were not calculated due to a lack of a practically applicable methodology. In December 2004 an extra methodology for the 'Valuation of Nature, Water and Soil in CBA' was launched to fill in the gap. As a result the Netherlands is the first country in Europe to make ecosystem valuation a compulsory component of SCBA. In addition a handbook was made with practical environmental factors which can be used in SCBA in the Netherlands. Witteveen+Bos has a separate group to execute SCBA projects and contributes to research and innovation in this area.

## **6.4. Monetarising Ecosystem Values in Kazakhstan**

In 2007, Witteveen+Bos as leading partner has been awarded a grant by the Dutch ministry of Economic Affairs for the application of the Dutch Guideline for Monetarising Ecosystem Values in Kazakhstan. Kazakh Guidelines have been drafted and a nature inclusive costs benefit analysis for a copper smelter in the Ili-Balkhash river basin in Kazakhstan has been carried out to show how the guideline is used in practice. The Ili-Balkhash river basin is located in the south-east of Kazakhstan and north-west of China. Two types of water ecosystem services are strategically important in this river basin: fish and fresh potable water reserves. Both are already under pressure and the situation becomes worse because the Kazakh economy is booming. The protection and sustainable use of water, soil and nature is therefore very important.

Prior to any investment activity it is obligatory to conduct an Environmental Impact Assessment (EIA) in Kazakhstan. However, the results of EIA studies do not indicate welfare losses and gains that an investment activity brings. This leads to ill-advised decisions resulting in ongoing depletion of nature,

water and soil. The Netherlands are the first country in Europe which have actually installed a guideline for cost benefit analysis including the economic value of nature, water and soil. Witteveen+Bos has made considerable contributions to this new Dutch guideline. Governmental authorities in Kazakhstan are currently considering the introduction of this nature inclusive costs benefit analysis in investment procedures.

**figure 6.4. Copper melting plant Lake Balkhash, Kazakhstan**



### **6.5. Jakarta floods and Semarang**

In 2001 Witteveen+Bos organised a seminar that proposed polder systems as a possible solution for flood problems in waterfront cities in Indonesia. To prove that the polder concept can contribute to lower flood risks, it has been decided to develop a pilot polder. The city of Semarang was chosen to provide a pilot area. In the waterfront city of Semarang flooding occurs daily due to large land subsidence and rising sea levels. This causes disturbance to society and disrupts economic development, for instance due to companies leaving the area.

Jakarta is one of many waterfront cities in Asia struggling with recurring floods. Witteveen+Bos Indonesia provides designs that can protect industrial areas from the worst flood damage. An industrial area can be transformed into a mini-polder, by surrounding the area with a dike or retaining wall.

The Semarang Pilot Polder project comprises four phases. Phase 1 (feasibility study) has already been executed. Working from the Witteveen+Bos office in Semarang, Phase 3 (technical design) is in progress, in co-operation with the Dutch Schieland and Krimpenerwaard District Water Board, which is responsible for Phase 2 (institutional implementation Polder Authority, PA). A guideline (phase 4, by UNESCO-IHE), addressing the experience of the previous phases, will be used to transfer knowledge to the PA.

The physical circumstances are quite different compared to the Dutch situation. For instance: the pilot area is densely built and contains an organic network of infrastructure, the rainfall is 5 times as intense and, moreover, the pilot area is subject to land subsidence of approximately 10 cm per year. Investigations regarding this are being carried out in order to provide sustainable solutions.

Beside the challenging technical aspect, the implementation of the polder concept in the existing social structures is a tough job. In order to manage the implementation, a PA has been set up in co-operation with local authorities. Gradually, the PA will take on responsibility for the polder management. In order to establish appropriate management, public support is essential. This requires extensive contacts with representatives of the local community. The PA will be trained on the basis of the polder guideline and intensive courses. At the end of 2008, the polder design and the guideline will be handed over to the

PA, which will need to be standing on its own feet by then. The PA will direct the construction of the polder system.

**figure 6.5. Building polders for flood protection in Jakarta**



## **6.6. FishFlow Innovations as solution for the restoration of fish migration routes.**

Over the last centuries numerous works have been built to control the water level, including dams, weirs, sluices, pumping stations, and hydropower plants. While these water works have increased the human safety, the construction of these works has had adverse effects for fishes because natural connections between water bodies have been obstructed and fish migration routes have been cut.

The migration movements of fishes consist amongst others of dispersal migration, reproduction migration, and migration to and from winter areas and are directed either upstream or downstream depending on the season. Most existent fish migration facilities are however aimed at upstream migrants.

FishFlow Innovations developed a number of fish migration facilities that raise the barriers for upstream and downstream migrating fishes. A common characteristic of all facilities that are available from FishFlow Innovations is that natural fish behaviour has been the point of focus during the development. As a result, all solutions that are offered comply as far as possible with the natural preferences of fishes. All too often the presence of fish migration barriers is considered a technical problem that needs a technical solution whereas the efficiency of fish migration solutions that have been developed with this approach appears to be not optimal in practice. The focus of FishFlow Innovations on the natural behaviour and preferences of fishes results in the development of facilities that fishes eagerly utilise and that enable passage without damage or mortality.

**figure 6.5. FishFlow siphon fish ladder**

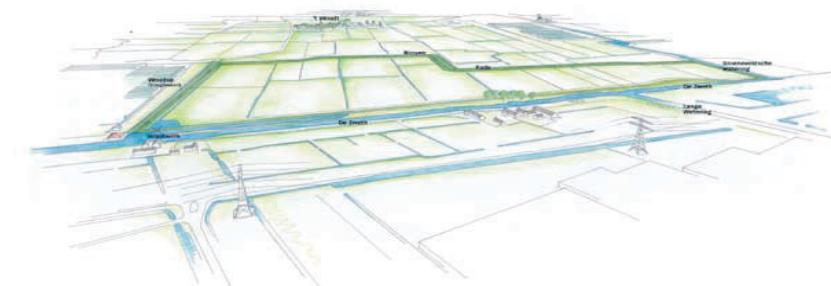


## **6.7. Calamity deposition in the Woudse Polder**

As a result of climate change and urbanisation the deposition of water has become of crucial importance for the safety of dikes and to prevent flooding and in the territory controlled by the Hoogheemraadschap Delfland. This is the reason why Delfland is realising a 34-hectare surface and 800-million litre volume calamity deposition in the Woudse Polder. The rainwater surplus in the region is temporarily captured in this deposition basin. It is estimated that the deposition basin will become operative once every 5 to 25 years.

The project was developed during an intensive preparation phase in a multistakeholder process, taking into account the specific archaeological, cultural, and natural values and visual resources of the area concerned. The result is an innovative design.

**figure 6.7. Impression of calamity deposition in the Woudse polder**



## **6.8. Underwater car parks in (sea) ports**

The development of parking facilities in urban areas is a difficult task. Space is scarce and parked cars on ground level are an eyesore in historical cities. The construction of parking facilities above ground level or underground occupies precious space and creates hindrance during the construction activities, and is also a costly process.

Witteveen+Bos developed a solution for the above-mentioned problem by using a new construction method for car parks: the construction of car parks below the water table in old harbour basins using the immersed tunnelling method. This immersion method has been applied world-wide for the construction of submerged traffic tunnels. To our knowledge no project for the construction of underwater parking has yet been realised using the immersion technique. This method is suitable for use in many of the 5,000 (sea) ports in the world.

**figure 6.8. Underwater car parks in (sea) ports**



## **6.9. Nominations and awards**

In 2007 Witteveen+Bos won or was nominated for various awards.

One of the nominations concerned the KASZA project. A greenhouse without wastewater: is it feasible? Is it viable? Do the costs outweigh the benefits? And what precisely are the benefits and who will they help? In the Kasza project (a Dutch acronym for greenhouse without wastewater) we sought answers to these questions. It emerged that closing the water supply chain creates excellent prospects for growers, water managers, provincial authorities and municipal authorities. From a technical point of view, it is possible for the glasshouse horticulture sector to treat and reuse all of the wastewater that it produces. From the viewpoint of sustainability and environment, this is highly desirable.

In the ONRI-KIVI/Niria competition for 'De Vernufteling' for the most inventive engineering project, we took the second prize for above-mentioned FishFlow innovations and the third prize for the design of underwater car parks in (sea) ports.

Alice Clijncke won the first Young Technical Professional Award, which goes to an engineer up to age 35 who excels in an exceptional way and works for an engineering firm. Witteveen+Bos finished second in the Eo-Wijers Award phase 2 and was nominated for the SCIA User Contest. The NVA/H<sub>2</sub>O award went to Witteveen+Bos for its article entitled 'Preventing eutrophication in the southern peripheral lakes'.

## **7. TARGETS AND INTENTIONS FOR 2008**

In 2008 Witteveen+Bos will continue to carry out the commitment to corporate social responsibility and increase efforts to contribute to sustainable societies. Our targets and intentions for 2008 are listed below.

### **monitoring and reporting**

Witteveen+Bos will introduce procedures for monitoring and reporting on the following issues:

- incidents of human rights abuse;
- incidents of corruption and bribery;
- percentage of female employees at senior and/or managerial positions.

For transparency reasons, Witteveen+Bos will incorporate a summary of internal audits on the quality system in projects and the internal environmental management system in the 2008 annual report of the company.

### **sustainability plans**

In 2008 our company will conduct a number of pilots on sustainability plans in project design phase. Guidelines, based on sustainability principles, will be drafted to be included in the project design procedures in order to stimulate employees who draft new projects and plans toward integrative sustainable thinking. Depending on the outcome of the pilots, further steps on incorporating sustainability plans into procedures will be taken at a later stage.

### **sustainable partnerships**

In 2008 Witteveen+Bos will make an inventarisation of possible partners to extend existing and form new partnerships for sustainable development.