Mission statement

Supported by its technological, operational and territorial knowledge, Aquafin wants to make a significant contribution to an integral and sustainable water policy for the Flemish Region and other clients.

In so doing, sustainable and efficient business practice forms the reference framework for Aquafin in which it strives continuously towards a balance between improving the environment, the economic result and working considerately with all employees.

Contents

Board of Directors of Aquafin NV

Board of Directors of Aquafin NV

Chairman	Ivo Van Vaerenbergh
Managing Director	Luc Bossyns
Directors	Willy Breesch
	Loïc De Cannière
	Brian Duckworth
	James Anthony Hill
	Geert Maes (until 25 March 2003)
	Francine Swiggers
	Wilfried Van den Heuvel
	Jhony Van Steen

Aquafin Management

Managing Director	Luc Bossyns
General Services Manager	Marc Dedecker
Operations Manager	Marc De Maeseneer (until 27 April 2002)
Operations Manager	Danny Baeten (as from 1 May 2002)
Infrastructure Manager	Dirk De Waele (as from 1 May 2002)
Engineering Manager	Marc Goossens (until 27 April 2002)
Commercial Manager	Boudewijn Van De Steene

Audit Comité

Chairman	Ivo Van Vaerenbergh
	Brian Duckworth
	Geert Maes (until 25 March 2003)

Human Resources Committee

Chairman	Ivo Van Vaerenbergh
	James Anthony Hill
	Wilfried Van den Heuvel

The Permanent Representative of the Flemish Region

Bruno Beels

Reviseurs d' Entreprises

Ernst & Young Bedrijfsrevisoren B.C.V.
represented by Rosita Van Maele

From left to right: Willy Breesch, Luc Bossyns, James Anthony Hill, Brian Duckworth, Francine Swiggers, Jhony Van Steen, Ivo Van Vaerenbergh and Wilfried Van den Heuvel. Not on the photo: Loïc De Cannière and Geert Maes.

Foreword

Over the past ten years, the Flemish Region has invested considerable amounts of money in wastewater treatment. The task of implementing this policy option was entrusted to NV Aquafin, an example of public-private cooperation. This initiative has already led to an increase in the level of water treatment from 33% to 57%. In the process, Aquafin has acquired know-how and experience that it is happy to place at the disposal of the Flemish Region, the towns and municipalities.

In 2000 the Flemish government decided to review its water treatment policy. This is necessary if the goals of the EU Framework Water Directive, which sets high standards for water quality and which demands even greater remediation efforts, are to be achieved efficiently. Attention was also paid to finding a new role and new incentives for Aquafin. The Board and shareholders of Aquafin have followed these developments. They have a positive attitude towards making the maximum contribution to the Region's environmental objectives and is ready to consider a review of the 'agreement' with the Region to fit with any new responsibilities and embrace an appropriate results oriented reward system. They are convinced that Aquafin has an important contribution to make to the Integrated Water Policy with a view to bringing Flanders within reach of the requirements of the European Framework Water Directive.

In order to support the main outlines of this new policy, Aquafin has successfully pursued a number of policy-support tasks, in which positive ecological trends are interpreted against the background of economic laws. This approach is in line with the new mission of Aquafin, which aims to meet the principal requirement of society both for today and tomorrow, namely 'sustainable enterprise'. In 2002, the new organization of Aquafin took shape; this does not mean however that the 'Aquafin 2020' upgrade process is now complete. A thorough, regionally-controlled approach should lead to a successful harmonization of the integrated water policy and the company's own business interests. To achieve this, it is necessary to work closely with the customer, who demands both quality and reliability.

Although Aquafin is in a transitional phase and though its staff are having to get to grips with new job profiles, the company is able to guarantee excellent results. Productivity clearly increases. With less staff more projects were realised in 2002.The Board is very grateful to its staff for those results. It will continue to strive to ensure that the best possible framework is created within which they can perform their tasks.

Ivo Van Vaerenbergh
Chairman

Report of the Board of Directors on the 2002 financial year

In 2002, water received an increasing amount of attention due to the floods in many European countries. The likely impact on water policy of the European Framework Water Directive is also starting to be more widely appreciated, not least by the municipalities. The decree on Integrated Water Policy is a unique event at administrative level. For Aquafin as well, 2002 was an important year. It was characterized by changes, by good results and by new challenges.

Changes

A strategically-oriented organization

In 2002 the reorganization programme entitled 'Aquafin 2020' was extensively and rigorously pursued. The management worked under the encouragement of the Board of Directors on the development of a new organization chart arranged under three headings: 'river basin based, 'process-driven' and 'results-oriented'.

In the 11 river basins in Flanders, Aquafin wants to treat as much wastewater as possible as efficiently as possible in conformity with the imposed standards. It also seeks to improve treatment efficiency still further by removing larger amounts of pollution load and by providing solutions that are specific to the region.

A great deal of attention was paid to the efficient functioning and integration of the company's various departments and directorates. The aim is to commercially exploit the available resources, knowledge and talent to the maximum possible extent. The greatest challenge that faces us now is to give the new mission and organization shape and form within the company's business culture. That demands a revolution in the way of thinking of all our staff. At Aquafin, a customer-centred attitude is just as highly regarded as technical skill. An increased awareness of our own cost price, investments and expenditure (e.g. energy), and working processes (e.g. safety) has now been made quantifiable thanks to the use of 'balanced score cards'. In this process the motivation and commitment of the management team are crucial. They lead the change process, implement the necessary actions and ensure follow-up and feedback.

Trend change in sewer policy

To ensure an acceptable water quality by 2015, attention must be focused not only on the connection of pollution load but also on positive ecological developments such as the realization of disconnections (separation of rain and wastewater) and a reduction in sewer flooding.

That Aquafin really means what it says in its disconnection policy is apparent from the results of the 21 masterplans (covering a tenth of Flemish territory) that the company has submitted to the Flemish Minister of the Environment. These plans list all the projects for bringing a treatment area into line with the requirements of the European Directives. Out of a total planned investment of 1.868 billion euros for the 21 areas, Aquafin devotes 60% to the laying of sewers and the building of treatment plants both large and small. The remaining 40% goes on projects for the disconnection of surface water and rainwater, conversion from mixed to semi-separated systems, and projects for reducing sewer flooding.

Put another way, this investment represents:

- a remediation of 263,000 PE
- a net disconnection of 97.21 l/sec. discharge of clean water
- the net disconnection of 953 hectares of paved surface
- the expansion of 97,945 m^3 of storage at overflows.

The intention is to draw up masterplans for all the treatment areas in Flanders in order to arrive at the desired treatment degree as efficiently as possible.

Commercialization of skills and knowledge

Rio*Totaal*

Aquafin wants to apply its knowledge and skill for the benefit of the municipalities to the fullest possible extent. To achieve this, a team of relationship managers came together and produced '**Rio***Totaal*'. The **Rio***Totaal* service package is especially useful for tackling the sewage problems with which the municipalities are confronted. Many municipalities want some idea of the quality of their sewer system and want to be able to estimate what the service-life of the system is and what renovation work will be required. At the same time, they have to invest substantially in the development of their system and in the connection of areas not currently on mains sewage. The **Rio***Totaal* municipal service package contains tailored products for the development and management of a municipal sewer system at technical, operational and financial levels. All products are carefully matched to one another in order to maximize return on investment. In 2003, the financing aspect of **Rio***Totaal* will be worked out as a matter of priority. However, in all its business dealings Aquafin always respects the autonomy of the municipalities.

Aquaplus NV

The inclusion of Aquaplus NV as a full subsidiary of Aquafin NV ensures a clear demarcation of the respective spheres of action of the two companies. Aquaplus focuses on industry and also wants foreign governmental and other organizations as its customers, preferably located in the new EU Member States. In 2002 a great deal of attention was paid to the new business plan, which is being implemented vigorously. Its mission reads: 'Aquaplus cares for water by realizing sustainable projects in the water sector.' Aquaplus is focusing its activities on a mix of products with a high added value, in the conviction that this is the best way to achieve its growth targets.

Results

Aquafin posted strong results in 2002. The company has shown that it can adapt to new conditions. Core competences are being closely monitored. Knowledge and experience are the subject of continuous exchange and feedback within a 'learning organization'.

Infrastructure

The company maintained a high delivery pace and achieved all its targets. 2002 was and 2003 will be a record year for deliveries. This is important if, by the end of 2005, we are to come close to achieving the basic efforts that the EU's Urban Wastewater Directive demands. In 2002 a total of 1,330 projects were delivered for a sum of 1.479 billion euros. This includes 93 new wastewater treatment plants and 48 upgrades.

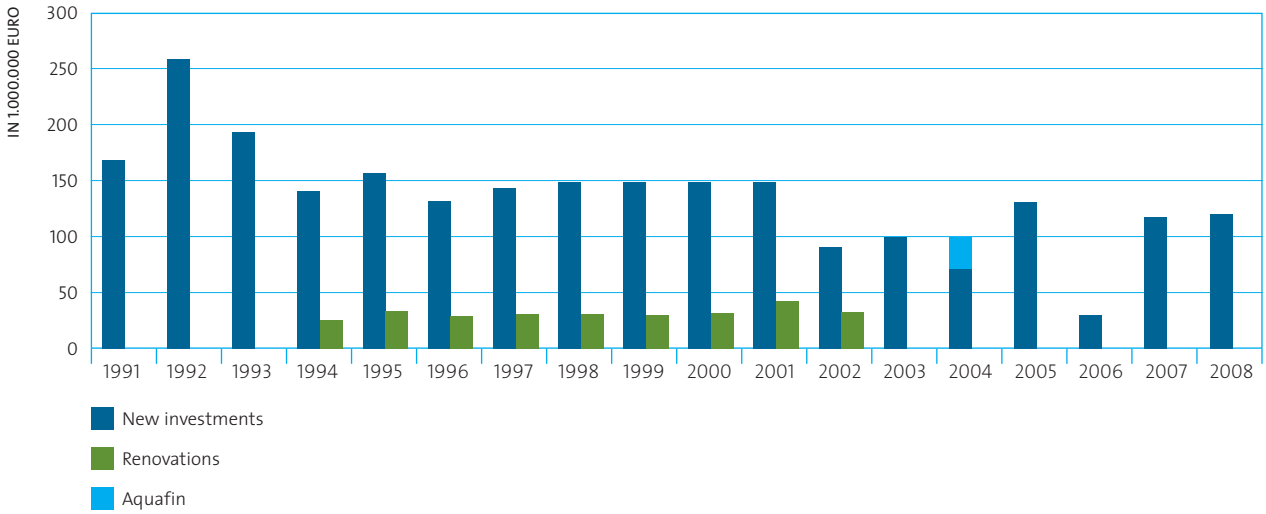
Aquafin has 37 small-scale water treatment plants in operation, 8 of which will disappear or be replaced as time goes by. 41 new ones are planned. A total of 70 small-scale plants are envisaged, which will allow Aquafin to acquire knowledge and skill as regards both treatment efficiency and integration into the landscape. In 2002 a 'code of good practice for the ecological management of reedbed treatment plants' was developed. The small-scale plants have certainly proved their mettle in those areas that are not on mains sewage.

However, to guarantee effective functioning and limited environmental nuisance, a complete separation of rainwater and wastewater is required. In order to convince a broad section of society of the feasibility of small-scale plants in the areas that are not currently on mains sewage,

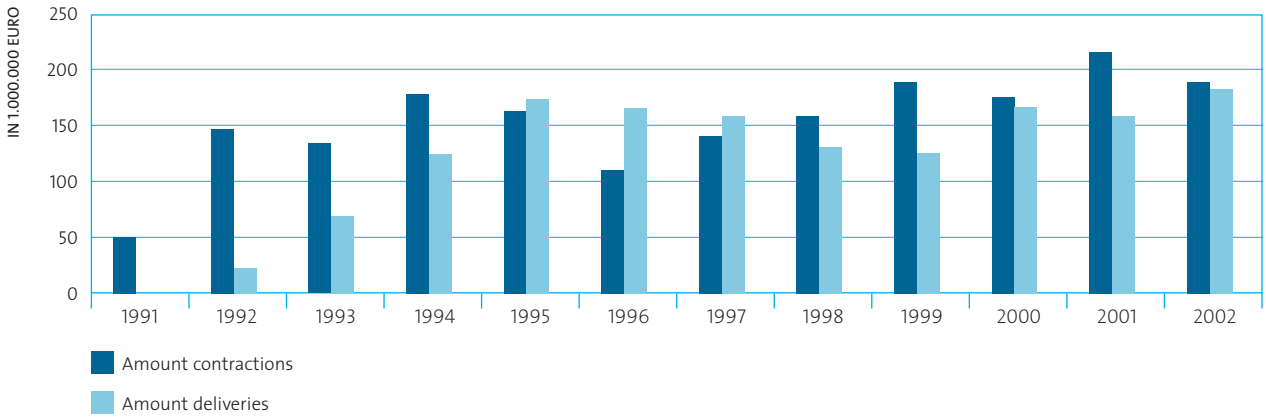
Deliveries

31/12/2002	Number	(WWTPs)	(000 EUR)
Delivered			
New projects	1,272	93	1,363,415.0
Renovations	58	48	116,282.0
Awarded or contracted			
New projects	268	30	400,787.6
Renovations	36	35	162,997.9
Planned			
New projects	570	68	738,149.8
Renovations	8	7	20,939.0
TOTAL	**2,212**	**281**	**2,802,571.3**

Evolution investment and renovations programme



Evolution contractions and deliveries



Aquafin will, at the request of the Flemish Minister of the Environment, be building an additional 10 small-scale plants. They will be pilot projects for the remediation of areas not connected to the main sewer network.

Investments

Since 1991 the Flemish Region has invested 2.8 billion euros in the construction of treatment plants and in systems for the transport of wastewater from municipal sewers to the treatment plants. We have had an indication of the level of investments in the years to come. At the end of 2002, Vera Dua, the Flemish Minister of the Environment, commissioned the rolling investment programme for 2004-2008 for an amount of 466.569 million euros. That programme is being drawn up by VMM. For the first time, Aquafin is being given the opportunity to propose itself – up to a limited value – sensible, high-priority projects arising from its masterplans.

Operations

Despite a new rainfall record in 2002, a maximum in pollution load was treated before discharge. 92 % of the plants achieved their targets. The fact that the quality of surface water is not making conspicuous progress is not in any way a reflection on the efficiency of the treatment plants, but is due to the degree of efficiency of the trunk sewers. Some municipalities are lagging behind somewhat in their sewer-laying activities and, in heavy rain, the overfull sewers consequently flood over into the brooks. A better separation of wastewater and the water that does not belong in the sewers will increase the percentage of pollution load connected to the WWTP.

Challenges

Management Agreement

In 1991 the Flemish Region concluded a Management Agreement with Aquafin NV, under the terms of which Aquafin would implement a 'catch-up' programme in the water treatment field. This agreement was first revised in 1993. In 2000 the contract with Aquafin NV was not (tacitly) renewed, and the period of notice of 20 years came into effect. At that time the Flemish government engaged in intense debate about a new wastewater treatment policy. Their discussions also focused on a new set of tasks and responsibilities for Aquafin. On 24 October 2001 the Flemish Parliament passed a resolution on the review of the management agreement with Aquafin. This review should have begun at the end of 2002. The Flemish Minister of the Environment has meanwhile defined a number of tasks in support of the new policy. Aquafin has successfully carried out its tasks, which involved the creation of draft zoning plans and masterplans. In 2002, Aquafin also informed the Flemish Minister of the Environment that, if desired, the company was ready and willing to review the agreement to fit with a new obligation to produce results in the interests of the Integrated Water Policy.

The European Framework Water Directive....

One of the requirements of the EU Framework Water Directive is that by 2015 all natural water must be of good quality. For the sewer owners - both municipal and transmunicipal - that means, in concrete terms, 100% remediation, the replacement of leaking sewers, and the limiting of polluting emissions from sewer overflows. For the task of achieving 100% remediation (which includes that part of Flanders that is not connected to mains sewers) the zoning and master plans that Aquafin has drawn up provide the answer. Based on the results of a number of draft zoning plans, it seems that the best way to achieve the 100% remediation is to split it into 98% collective remediation and approximately 2% individual. After the appropriate field trials have been performed, the right treatment degree for Flanders can be determined. The Flemish government approved these pilot projects in July 2002, and a decision was made to assign to Aquafin the task of developing draft zoning plans for the whole of Flanders. After a thorough external validation, the Minister of the Environment gave the green light in December 2002.

Zoning plans make no judgement on how this treatment degree will be achieved. That is done in a masterplan. A masterplan provides, for each treatment area, an overview of all the remediation projects that will be organized in order to achieve the required degree of treatment at minimum cost. The projects will be ranked in descending order of ecological profit. At the request of the Minister of the Environment, Aquafin submitted a first series of masterplans at the end of June 2002. The aim is that these masterplans will help Aquafin to comply with its obligation to produce ecological and economic results: an investment will only be made if the works in question produce an immediate benefit downstream. This first series deals with 21 treatment areas, covering approximately a tenth of Flanders. After validation the methodology will also be applied to the whole of Flanders.

... and the vision of Aquafin

Today our sewer network is reasonably well developed. 85% of dwellings are, in principle, connected to a sewer (although many sewers are not worthy of the name and, in spite of an obligation to connect, many households are still discharging their wastewater into a communal ditch). But only 57% of the wastewater actually ends up in a treatment plant. To bridge that gap, 'missing' sewers must be laid and smaller treatment plants built. Aquafin has calculated that, globally, a further EUR 7.44 billion is required for investment in treatment infrastructure before 2015. The municipalities will also have to provide management programmes for the renovation, maintenance and optimization of the existing sewage infrastructure, the value of which is estimated at EUR 11.8 billion.

The scope and complexity of this task exceeds, in many cases, the abilities of the municipalities from both technical and quality standpoints. The municipalities cannot possibly cope with these challenges alone. Aquafin would like to offer its services, on a partnership basis, to help develop and maintain the municipal treatment infrastructure.

Research and product development

In the new organizational structure, innovation and flexibility remain critical success factors. Aquafin in general and its Research & Product Development department in particular now have sufficient critical mass to be able to conduct further research and product development in eight knowledge areas: sludge management, modelling, measurement & control technology, 'green' technology, biological wastewater treatment, physico-chemical treatment techniques, membrane technology and reuse. In these tasks it works closely with scientific organizations and the Universities of Antwerp, Ghent and Leuven. The Aquafin-Severn Trent Biomac patent was published at European level (patent EP1270513). Biomac is a water treatment concept that uses active charcoal and a membrane bioreactor to produce recycled water and to treat wastewater that proves resistant to other methods. In 2003 Aquafin will be actively participating in three research projects for the European Union. These relate to the management of treatment systems for urban wastewater, the reuse of wastewater and integrated water management.

Financial disputes

The VAT dossier

As already mentioned in last year's annual report, there is a dispute between Aquafin and the Belgian VAT authorities regarding the rate of VAT applicable to the company's activities. Aquafin feels that is entitled to the reduced rate and has therefore lodged an objection against the decision of the VAT authorities to apply the increased rate of 21%. This legal action, which is being pursued in consultation with the Flemish Region, is pending.

The action will not have any negative impact on Aquafin, as the management agreement concluded with the Flemish Region provides for taxes being treated as 'reasonable expenditure'. The money will therefore be reimbursed by the Flemish Region. This standpoint was confirmed by the decision of the Flemish Government of 26 April 2002 in which it agreed to sign an agreement with Aquafin explicitly stating that – as long as the matter is handled responsibly and with due care – all the potential financial impact of the dispute will be passed on to the Flemish Region.

Comments on the balance sheet

At the end of the financial year the balance sheet total was EUR 1,929 million, which is EUR 250 million higher then the previous financial year. This growth is almost entirely due to the net growth in the investments in the wastewater treatment infrastructure on the instructions of the Flemish Region. These installations will remain the property of Aquafin NV until the management agreement with the Flemish Region ends.

As was the case last year, there was a high level of construction activity. This found expression in a further increase in works in progress to EUR 315 million.

Financial fixed assets includes Aquafin's majority participation in Aquaplus, which amounts to EUR 2.931 million. As at 31 December 2002 this participation was valued on the basis of the most recent business plan; as a result, a downward adjustment of EUR 0.574 million has been posted for this participation.

The missions which were carried outside the framework of the Agreement and which have still not been completed are shown under the heading Orders in progress. Globally considered, this heading remained at the same level as in the previous year.

During the year, trade receivables increased substantially, from EUR 23.5 million to EUR 89.6 million at the end of 2002. The large payment backlog at the Flemish Region is due, among other things, to an insufficient contribution to the budgeting of the Minafonds for 2002 caused by the VAT problem, where allowance was only made for a reduced VAT rate of 6%. In addition, the increase in trade receivables was also caused by a delay in the payment by the FFEU (funds for the financing of non-recurring expenditure), which was responsible for part of Aquafin's budget. This latter sum has been paid early in 2003.

The increase in outstanding trade receivables has led to additional financing requirements. As already stated in the annual report for 2001, on 26 April 2002 Aquafin concluded an agreement with the Flemish Region relating to the VAT problem which stipulates, among other things, that the extra financing cost is a reasonable expenditure and will therefore be reimbursed by the Flemish Region.

Sundry receivables include the claim against the Flemish Region relating to the additional VAT claim (i.e.

the problem of whether the applicable rate is 6% or 21%). This amounts to EUR 241.7 million. This claim is based on the agreement of 26 April 2002, which stipulates that as long as Aquafin acts responsibly and with due care all the possible consequences of the dispute with the VAT authorities can be charged on to the Flemish Region. The increase in the VAT claim compared with last year is the result of the interest adjustment.

If the General Meeting accepts the proposed profit distribution, the legal reserve will be raised by EUR 0.576 million. The available reserve remains unchanged.

In execution of the management agreement with the Flemish Region the investments will be repaid over 15 years. This reimbursement pace is faster than that for the depreciations: this will create a positive balance which, after the reimbursements have been made, will be used to further finance the depreciations. This positive balance will - with the approval of the Accounting Standards Committee - be recorded in a special liabilities account entitled 'Reimbursement from the Flemish Region'. The amount of EUR 285 million relates to all projects that had been delivered by the end of the financial year.

The provision for risks and charges was reduced by EUR 1.0 million. The necessary adjustments have been made on the basis of the most recent data. One may notice that the number of legal disputes has strongly decreased, especially those involving owners of land bordering on works. The provision for risks and charges relates to legal disputes, disputes relating to the management agreement and the processing of the sludge that is buffered at the plants.

Long-term financing is based on the 'affectation agreement'. This stipulates that the balance of the long-term loans must be less than the claims that Aquafin NV has on the Flemish Region. These claims consist of the still unpaid portion of the already delivered investment projects. In this context Aquafin has taken up EUR 155 million in long-term loans, EUR 80 million of them with the European Investment Bank and EUR 75 million with commercial banks. Taking into account the reimbursements of previously contracted loans, the balance of the long-term bank loans amounted to EUR 868 million, 78 million of which has to be reimbursed within the year.

The increase in works in progress and in particular the increased payment backlog at the Flemish Region has had a significant impact on the short-term loans, which have risen by EUR 91.0 million to EUR 298.5 million. This latter amount consists of EUR 123 million in drawdowns within the existing credit line amounting to EUR 298 million and EUR 175.5 million in commercial paper for the programme, amounting to EUR 250 million.

Under the heading Liabilities relating to taxes the extra VAT debt (6 % - 21 % problem) amounting to EUR 241.7 million has been entered.

Comments on the profit & loss account

In the management agreement with the Flemish Region it is stipulated that reimbursement is based on the charging on of all reasonable costs plus an allowance for the shareholders based on their investment of capital. It follows from this that the costs and revenues are largely a mirror image of one another. The increase in costs and, in particular, in the costs of services and other goods, remuneration and social security costs and pensions are in line with the growth in the infrastructure which Aquafin operates.

The ongoing growth in assets explains the continuous growth in depreciations. The movement shown on value depreciation and provisions relates partly to the advice of the Permanent Representative on the 2000 and 2001 financial years and partly to the decreases in value and provisions contested by the Flemish Region during the recently closed financial year.

Due to the increase in short- and long-term financing (+EUR 178 million) the cost of debts grew by EUR 2.4 million. After adjusting for provisions, decreases in value and costs and revenues not charged on to the Flemish Region, the profit before tax is EUR 21.00 million.

Proposal to the General Meeting

Taking into account the profit after tax for the financial year of EUR 11,501,874.03 and a transferred profit of EUR 4,019.72, the profit available for distribution is EUR 11,505,893.75.
On the basis of a maximum payout of 95 % the following profit distribution is proposed to the General Meeting:

- addition to the statutory reserve: EUR 576,000.00
- dividends: EUR 10,924,103.12
- transferred profit: EUR 5,790.63

If the General Meeting approves the proposed profit distribution then the following gross dividend will be paid out on 1 June 2003:
- EUR 27.25 for the shares fully paid up on 25 April 1990.
- EUR 13.63 for the shares that are not fully paid up.

Mandates

The mandates of several of the Directors will end at the conclusion of the Annual General Meeting of Shareholders that will express an opinion on the financial year 2002. The Board will submit the necessary proposals with respect to the shareholders during the General Meeting on 16 May 2003.

Environmental results

Results wastewater treatment plants

As the years have gone by, effluent norms have become increasingly stringent. Even so, Aquafin has made sure that more and more treatment plants meet those norms each year. In 1992, the percentage meeting the norms rose to 92%. Treatment efficiencies have also improved. More and more treatment plants are also meeting the norms for nitrogen removal. The treated wastewater is also of better quality. We are accordingly making fewer demands on the self-purifying capacity of the receiving watercourses. Despite an especially wet 2002, more pollution load was fed to the plants than in previous years. The most important waste product - treatment sludge - is no longer being dumped and is instead finding useful applications to an increasing extent. The digestion process means heat, 'green energy' and low electricity and natural gas bills. Each day Aquafin searches inventively for ways of obtaining a better treatment result at lower cost.

92% of our 193 treatment plants meet the legal norms. Treatment efficiencies are improving, while discharged concentrations are falling. The number of treatment plants with inadequate nitrogen removal has fallen to 16.

In spite of an especially wet 2002, more pollution load was fed to the plants than ever before. Additional connections of wastewater, new treatment plants and more pumps have removed wastewater from the streams and rivers. More and more treatment plants have been adapted to enable larger discharges to be processed biologically.

During 2002, sludge dumping stopped completely. A larger volume of sludge has been dried and incinerated. Useful applications for it have been sought and found. Sludge has been processed for use as a lime fertilizer and as a sealing layer for dumps. Digestion has produced biogas (and, therefore, heat and green energy). As a result, it was possible to make savings on our consumption of natural gas and electricity.

Achieving a better effluent is no pushover. It demands hard work and inventiveness. We can illustrate this with the help of the initiatives that have been taken at Houthalen WWTP. There, automation is ensuring that a stable effluent of good quality can be discharged into the Laambeek even with heavily fluctuating pollution loads reaching the plant. Here again there have been savings on electricity bills.

More wastewater treated more effectively in 2002

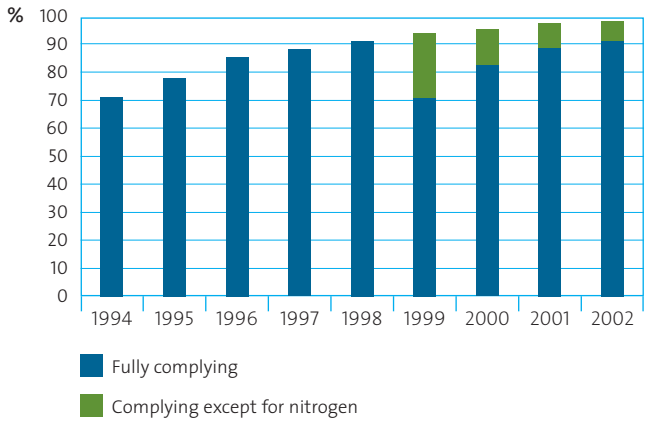
More and more treatment plants are meeting all the effluent norms

The effluent results for 2002 were evaluated for 193 treatment plants. 177 treatment plants (or 92% of all plants) met all the imposed emission limits. All the treatment plants built by Aquafin of more than 10,000 PE are achieving the nitrogen standard. 16 of the plants taken over from the VMM do not yet meet the norms for nitrogen removal. One of these, the Antwerp-South plant also failed on other parameters. The renovation work required to achieve improvements there is now in full swing.

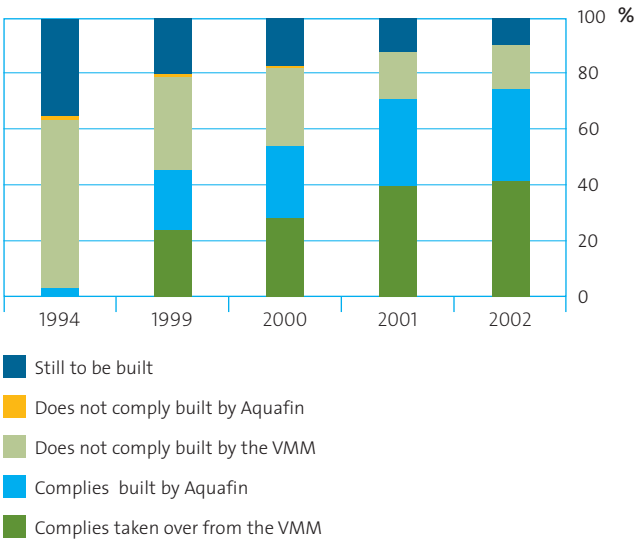
The number of treatment plants that meets the norms for nitrogen is rising. In 1994, when Aquafin took over the operation of all existing treatment plants from the VMM, no nitrogen norm had yet been legally imposed. In 12 Flemish agglomerations where, according to the European Urban Wastewater Directive, nitrogen has to be removed, a treatment plant has yet to be built.

Antwerp-South is currently being renovated in order to comply with the effluent standards.

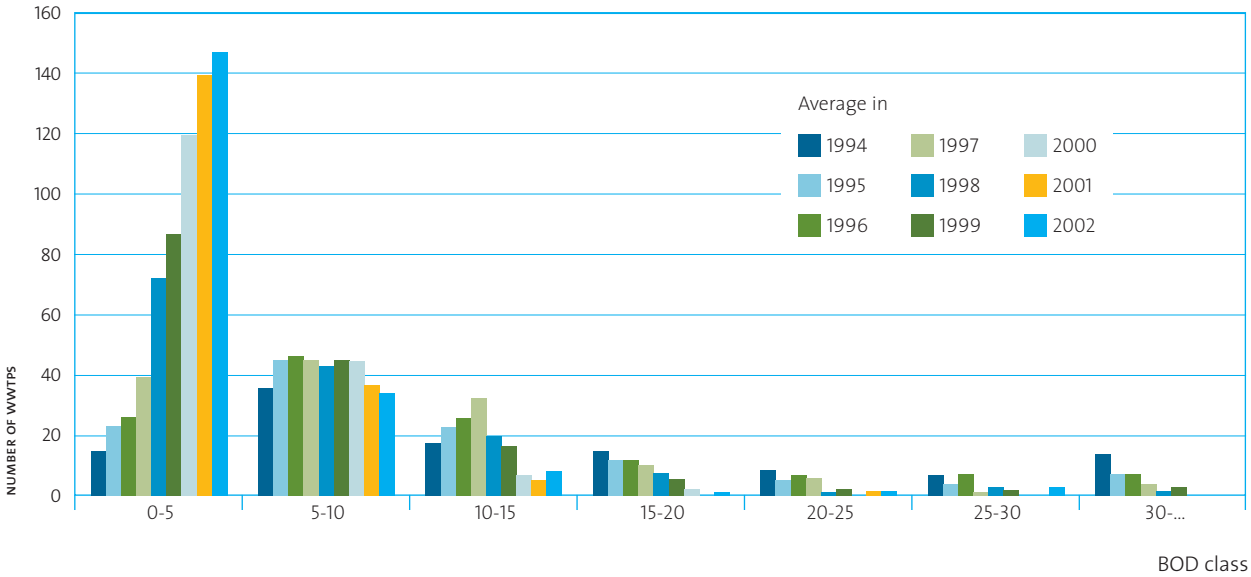
Evaluation of effluent results



Number of WWTPs complying with the current nitrogen standards



Classification of WWTPs according to their effluent's BOD

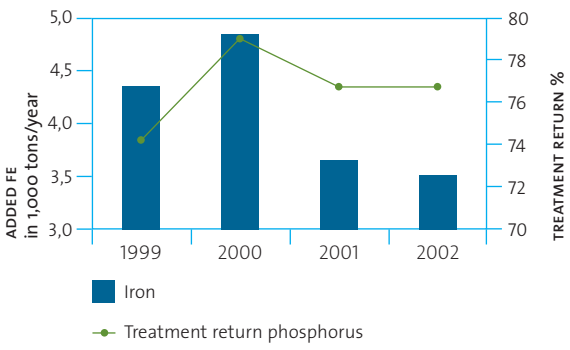


Treated wastewater of an increasingly good quality

In 2002 the average biological oxygen demand (BOD) of the effluent was below 10 mg/l for 93% of the treatment plants. In 1994 this percentage was only 47%. This BOD shows how much oxygen per litre is required for the biodegradation of the residual pollution load discharged by the treatment plants. Each year an improvement of this parameter can be noted.

in mg/l	1997	1998	1999	2000	2001	2002
BOD	13.8	7.4	6.8	4.4	5.0	4.3
COD	76.8	58.6	56.3	50.4	46.3	42.4
Suspended solids	21.8	17.2	21.6	12.2	11.5	11.4
Total nitrogen	21.7	16.3	16.8	14.8	11.9	11.8
Total phosphorus	2.8	2.0	1.9	1.8	1.0	1.4

28% less chemicals use (FE) with a loss of removal efficiency of only 2%



The average effluent concentrations have improved considerably since 1997. Considered overall, they have been halved. With the exception of 'total phosphorus' they were lower in 2002 than in 2001.

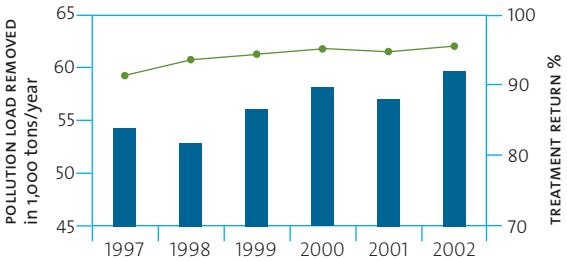
Improved treatment efficiency

The graphs on page 19 show the pollution load removed at all treatment plants taken together. For each parameter measured (BOD, COD, suspended solids, total nitrogen and total phosphorus) the difference between the biologically-treated pollution load and the load discharged after biological treatment is shown. The treatment load per measured parameter is also shown. The treatment efficiency is equal to the pollution load removed during the biological treatment divided by the biologically-treated pollution load.

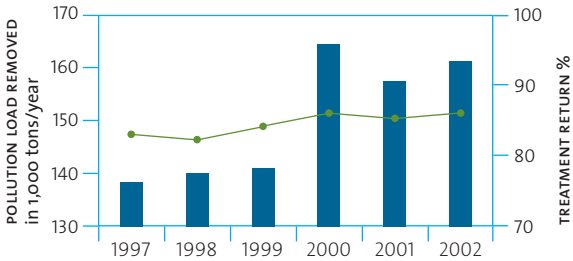
On all parameters, more pollution load was removed in 2002 than in 2001, and efficiency rates also rose slightly. The treatment efficiency for total phosphorus stabilized after optimizations of the dosages of added chemicals. In 2 years the consumption of chemicals fell by 28%, while the removal efficiency fell by only 2%. This is good news for the environment. The efficiency remains above the 75% target value for Flanders laid down in the VLAREM. A lower consumption of chemicals also means lower dissolved chloride and sulphate concentrations in the effluent and a smaller sludge waste mountain.

Pollution load removed and treatment return

BOD



COD



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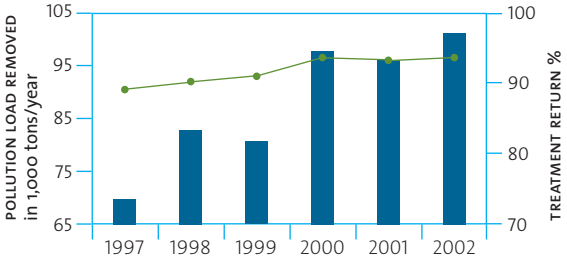
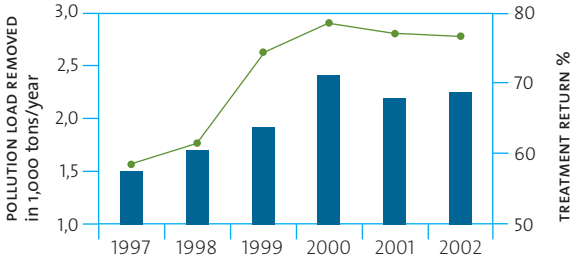


Ptot



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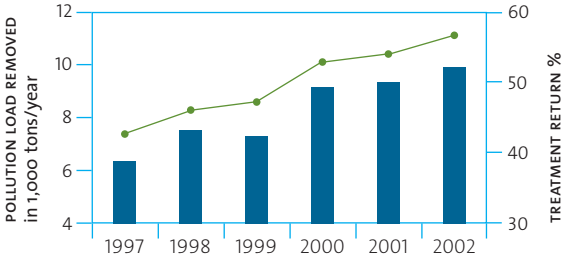
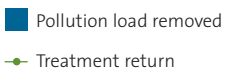




Despite a very wet 2002, more pollution load reached the treatment plants

Londerzeel WWTP.

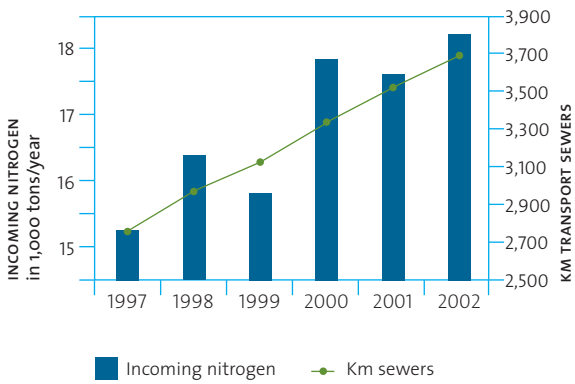
2002 was another especially wet year. With an annual total of 1,078 mm, the annual depth of precipitation at Ukkel was exceptionally high: this was the second highest figure recorded since meteorological observations in Ukkel began in 1833. The previous record dated from 2001, with a total depth of precipitation of 1,089 mm. The normal depth of precipitation is only 780 mm.

Because a great deal of rainwater as well as wastewater is discharged into the mixed sewers, in a wet year greater losses of wastewater from the sewer to the stream are to be expected. The result is a smaller quantity of pollution load reaching the treatment plants.

This reasoning did not apply in 2002 – quite the opposite in fact. There are various reasons for this. Due to the expansion of the trunk sewer network and the increase in both the number of treatment plants and the number of plants where all the pumped discharge is biologically treated, the volume of incoming pollution load increased. Never before have so much BOD, suspended solids and nitrogen been channelled to the treatment plants.

More than 90% of the pumped discharge was treated completely biologically. The other 10% was, after mechanical and physical pretreatment, discharged via the rainwater treatment line. In 2002, an extra effort was also made to pump up more diluted sewer water in order to reduce losses of pollution load to the streams and rivers. The downside to all this is that this extra effort required an increase in electricity consumption.

More kilometres of transport sewers, more incoming nitrogen



	1996	1997	1998	1999	2000	2001	2002
Pumped discharge (millions of m^3/year)	360	418	594	591	659	731	720
Electricity consumption (kWh/PE)	37.4	40.5	50.4	49.9	53.7	60.2	59.5
Biologically treated discharge (millions of m^3/year)	339	386	523	537	598	652	649

More useful applications for our sludge

An ecologically healthier sludge disposal

Sludge disposal has evolved over the past few years. There has been a shift from dumping to co-incineration. Dumping totally ceased in 2002 thanks to the commissioning of the drying unit in Houthalen. This dried sludge is put to good use in a coal-fired power station and in the cement industry.

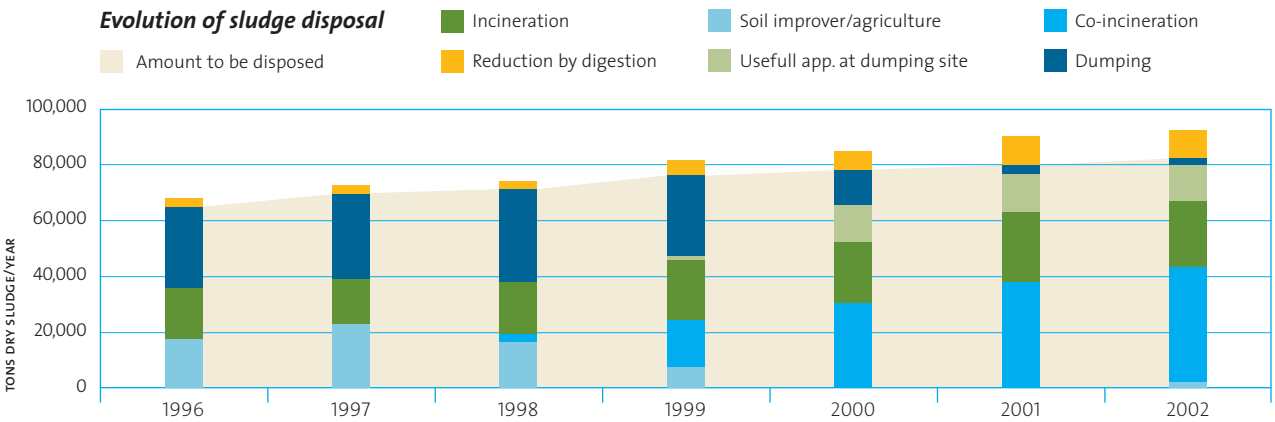
Incentive for reusing treated plant sludge as lime fertilizer

Water treatment sludge can, under certain circumstances, be used as fertilizer or as a soil improver. In the case of Aquafin sludge, the only possible application of this kind is as lime fertilizer. This fertilizer is produced according to the N-Viro procedure. This involves mixing alkaline additives with dewatered sludge, followed by a composting stage. Thanks to the combination of a high pH value and the heat development, a stable and hygienic end product (N-Viro) is obtained. This plant became operational at the end of 2002.

A certificate of use and an exemption for 40 treatment plants were requested from, respectively, OVAM and the Ministry of Agriculture. OVAM granted a certificate of use for 40 treatment plants. For 25 plants Aquafin received an exemption from the Ministry of Agriculture. As a result, at the end of 2002 it became possible to process 1,700 tons of dry sludge via the N-Viro process and to then find a 'green' use for the sludge. This has provided us with the incentive to, in the future, try to use 7,500 tons of dry sludge per year as lime fertilizer.

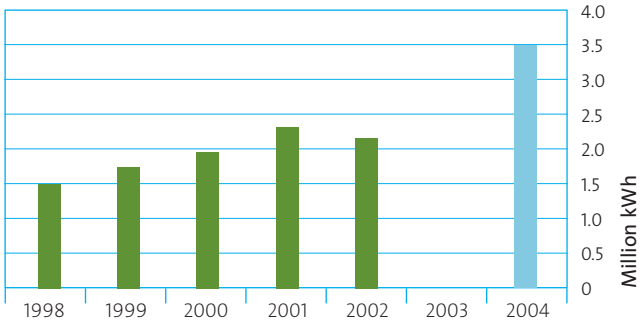
The new dryer on top of the sludge incinerator in Bruges.

Evolution of sludge disposal



Water treatment sludge can be used at dumps as a supporting layer with a water-inhibiting capacity.

Electricity production from biogas



Useful applications for sludge at dumping sites

Water treatment sludge can be used at dumps as a supporting layer with a water-inhibiting capacity. This layer, which is created by the Hydrostab process, consists of a mixture of residues, of which 40-45% WWTP sludge, with the addition of a quantity of water glass. Until May 2002, water treatment sludge was processed to form Hydrostab at the Razob dump in Nuenen (The Netherlands). The creation of a test bed at the Hooge Maey intermunicipal dumping site in Antwerp made it possible to use the Hydrostab process on the dumping site in a soil remediation project. In May 2002, therefore, we switched from Nuenen to Antwerp. In addition to the utilization of the sludge in Flanders, a reduction in transportation of 63,000 km was also realized as a result!

Drying sludge with recovered heat

In 2002 the use of heat from the steam of the incinerator of the regional environmental body Regionale Milieuzorg became a reality. Whereas in 2001 primary energy (incineration of fuel oil) was still being used to dry the sludge to 90% dry matter, since the spring of 2002 primary energy has no longer been used and full use is made instead of the steam from the incinerator.
Thanks to the new dryer at the incinerator plant in Bruges, a part-stream of the dewatered sludge can be predried, thus avoiding the auxiliary firing of coal. In 2002 it was possible to process 21,000 tons of dry sludge in the incinerator.

Biogas production by sludge digestion

In the digestion of treatment sludge, organic material is broken down and converted into biogas. As a result, the volume of sludge that has to be further treated is reduced and the sludge disposal costs go down. The biogas produced can replace natural gas in combustion processes. It is also used as a fuel for gas engines. These generate electrical current - so-called 'green energy'. Thanks to this development, Aquafin does not need to buy so much electricity. The gas engines also produce, in addition to electricity, heat that is used to warm up the sludge digestion process and the departmental buildings as well.

Most of the biogas produced is not, however, converted into electricity but is used thermally. At the sludge dryer in Deurne, 2.3 million m^3 or 53,550 gigajoules of biogas was used as a co-fuel with natural gas for drying sludge. Thanks to this innovation, approximately EUR 250,000 was saved on the natural gas bill.

Green energy production in 2002 was 2.13 million kWh. Aquafin currently has 7 water treatment plants with biogas engines - at Sint-Truiden, Leuven, Hasselt, Genk, Dendermonde, Zele and Zwalm. The old gas engine at Dendermonde WWTP was replaced in a renovation project. As a result we have not produced any green energy in Dendermonde for 9 months. This led to a slight fall in electricity production in 2002. At the end of March 2002, Aquafin was certified by VREG, the Flemish regulator for the electricity and gas market, as a producer of green energy.

In January 2003, Aquafin sold its first 1,200 green energy certificates. By 2004 we are aiming for a total installed capacity of 3.5 million kWh. New gas engines are planned in Antwerp-South (348 kW), Ghent (400 kW), Harelbeke, Lichtaart, Turnhout, Hoogstraten, Morkhoven and Westerlo. This initiative fits in with OVAM's Sludge Execution Plan, which envisages the development of sludge digestion as a pretreatment.

How a bit of tinkering increased efficiency: Houthalen WWTP

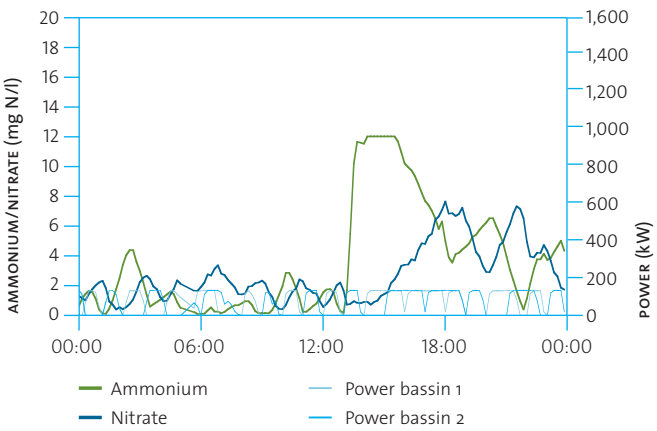
Since the start-up of the sludge dryer in Houthalen at the end of 2001, the nitrogen load at Houthalen-Central WWTP has increased. At the beginning of 2002 we were, as a result, struggling with higher nitrogen values in the effluent.

The load that has to be processed changes constantly. This is due to the operation of the dryer, the changeable composition of the influent, and the inflows of septic material. Many different kinds of adjustment to operations therefore have to be made. Unfortunately, interventions were not always timely enough to compensate for the changes in oxygen demand. It was therefore not always possible to avoid fluctuating effluent concentrations. Automation therefore had to be introduced.

On 16/07/2002 a new form of control was introduced based on the on-line measurement of nitrate and ammonium concentrations in the aeration basin instead of on a time basis. As a result, fluctuations in load are automatically compensated for without the need for extra interventions by the operators. As an example, a graph is shown of the operations on 26 August 2002. At noon that day, 21.7 tons of septic material was delivered from the Pukkelpop rock festival. This resulted in a significant increase in the ammonium concentration in the reservoirs. The control reacted to this by automatically allowing more time for the aeration of the two reservoirs (visible in the supplied powers in the graph), so that the peak was rapidly processed. Without the automatic control a change in load of this kind could cause several days of disruption.

Houthalen WWTP. In 2002 a new form of control was introduced based on on-line measurement.

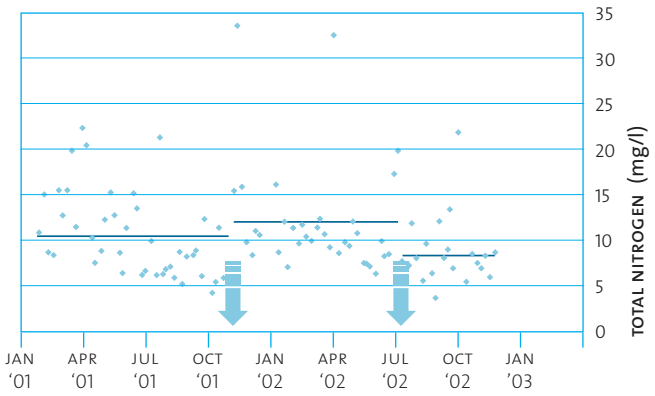
Delivery of 21.7 tons of septic material (12:00h)



The use of the automatic control ensures an optimum setting for the aeration, which gives a better effluent. A second illustration shows the results of the VMM analysis for total nitrogen between January 2001 and January 2003. The first arrow is pointing to the start-up of the dryer, resulting in an increase in the effluent values and also in the incidence of high peak values as a result of peak loads. The second arrow corresponds to the start-up of the on-line control. This resulted in a fall in the effluent values.

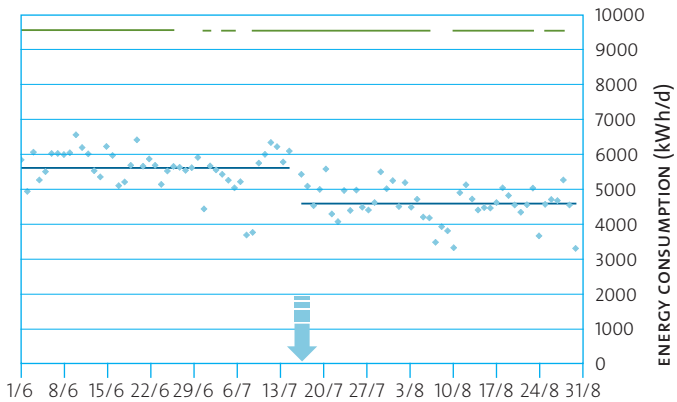
The on-line control ensures that an extra effort is made where necessary, but only where necessary, so that in periods of lower load less aeration can suffice. Logically, a saving on aeration energy can also be expected, given that peak loads only arise sporadically. That is also apparent from the third graph, in which the energy consumption of the treatment plant is shown in the months before and after automatic control was introduced (indicated by the arrow).

Effluent results in mg Ntot/l



First arrow: start-up dryer
Second arrow: start-up on-line control

Energie consumption WWTP before and after the control indicated by the arrow



The blue line indicates the operation of the dryer

Soil remediation at our treatment plants

New cases of soil contamination and groundwater pollution are tracked down and remediated as quickly as possible. 'Old' cases of soil contamination (i.e. dating from before Aquafin's foundation) are also investigated. We prefer to combine remediations at treatment plants with renovation work. That way we can be sure that the contamination will not spread any further - and we save money too.
Most sites where water treatment plants are located seem to be polluted by one or more chemical substances. Usually, however, the contamination is not that serious. Only a minority of sites has to be remediated.

26 Tracing soil contamination

At 141 treatment plants, an initial orientational soil survey was performed. 110 sites were subsequently placed on the 'register of polluted soils'.

27 Descriptive soil surveys

These orientational soil surveys revealed that Aquafin would have to arrange for 29 descriptive soil surveys to be performed. Of these, 15 have already been carried out while a further 3 are still in progress.

28 Soil remediations

The descriptive soil surveys revealed that, for 10 plants, no soil remediation project was necessary. For 5 plants, however, a remediation phase will be required.

29 From initial survey to remediation: Nijlen WWTP

First the certified expert evaluates the pollution thoroughly, examining the contamination of the groundwater and of the solid part of the soil, the age of the pollution, and the speed at which the pollution is moving. He recommends interventions where necessary.

Searching for soil contamination

Soil sample being taken from underneath a concrete slab.

The orientational soil survey

At sites where a company is engaged in a so-called 'high-risk activity', an orientational soil survey is obligatory. This has to be done by an external certified expert. The aim of an investigation of this kind is to find out whether there is any substantial evidence of soil contamination on the land in question. High-risk activities in the sense of the Soil Remediation Decree are also performed at our treatment plants.

The date of the first compulsory measurements depends partly on the age of the plant but also on the date of the environmental permit and on the type of high-risk activities involved. Since 1995, initial orientational soil surveys have been performed at 141 plants. Eleven smaller plants dating from the period before the Soil Remediation Decree entered into effect (at the end of October 1995) have still to be investigated for the first time before the end of 2003.

Depending on the complexity of the plant, this survey will have to be repeated every 5, 10 or 20 years – every 5 years if the plant dewaters treatment sludge from other plants and every 10 years if septic material is processed there or if it has a storage tank containing high-risk products (such as iron chloride). For basic (usually smaller) water treatment plants without 'sideline' activities of this kind, an orientational soil survey performed every 20 years suffices. A soil survey also has to be performed when operations are terminated at a treatment plant, as in the case of the treatment plants recently taken out of service at Balen, Lede, Zedelgem and Nieuwpoort. Twenty-three of our plants had already undergone a second orientational soil survey in 2002.

Soil surveys performed

	'95	'96	'97	'98	'99	'00	'01	'02	TOTAL
1st orientational soil survey	1	2	7	32	66	9	17	7	**141**
2nd orientational soil survey	0	0	0	0	0	0	0	23	**23**
descriptive soil survey	0	1	1	0	4	2	4	3	**15**

The register of polluted soils

Soil surveys evaluate about 50 chemical substances measured in the soil and groundwater. If contamination is confirmed during an orientational soil survey then the Flemish Government, acting on the advice of OVAM, will place details of the relevant plot of land on the 'register of polluted soils'. The data from this register is used for, among other things, drawing up soil certificates (which are mandatory when, for example, land is sold). Of the 141 Aquafin treatment plants investigated, 110 contained a plot of land that had to be entered in the register of polluted soils. Only at 31 sites was no contamination found. Fortunately, inclusion in this register does not mean an acute or chronic hazard for people living in the vicinity or for our staff. It does mean that, for at least one of the investigated chemical substances in the soil or groundwater, concentrations have been measured that exceed 80% of the soil remediation norm applicable to nature reserves and agricultural land.

Descriptive soil surveys

A descriptive survey examines how far and how deep the soil contamination has spread. In his or her report the soil expert must also express an opinion on whether or not the contamination constitutes a risk to man or the environment. A descriptive soil survey of this kind must be performed immediately after an orientational soil survey if any new contamination is discovered. If the contamination is historical (i.e. dating from before October 1995), then the question of whether a descriptive soil survey has to be performed depends on the severity of the soil contamination. It is also possible in such cases to wait for OVAM to issue a warning.

At 15 treatment plants (in Bruges, Dendermonde, Mechelen, Antwerp-South, Deurne, Antwerp-North, Hoogstraten, Turnhout, Nijlen, Mol, Leuven, Zemst, Genk, Overpelt and Avelgem), Aquafin has already had descriptive soil surveys carried out. At Genk, Sint-Truiden and Kortemark a descriptive soil survey is underway. In the case of Genk this is a second descriptive survey.

At 11 plants a descriptive soil survey must also be performed, but these surveys can wait as the plots of land in question have historical soil pollution that does not pose a threat. The treatment plants in question are located at Nerem, Zonhoven, Lommel, Ertvelde, Harelbeke, Bilzen, Geel, Itegem, Berlare, Duffel and Burcht.

Soil sample taken with hand drill.

The results of the soil surveys

Number of treatment plants investigated	141
Inclusion in the register of polluted soils necessary	110
Descriptive soil survey necessary	29

Soil remediation projects

At Mechelen-Noord WWTP renovation works were combined with the remediation of the dump site on which the plant was built.

At the treatment plants at Nijlen, Avelgem, Deurne and Mechelen, the descriptive soil survey also effectively formed the grounds for a soil remediation project. In the other cases it was established, during the descriptive soil survey, that the pollution was historical and formed no threat; that the pollution came from neighbouring land (in the case of the nickel pollution in Hoogstraten); or that it was not as serious as first thought (Overpelt).

Descriptive soil surveys awaiting execution: 29

Survey performed - remediation necessary	5
Survey performed - remediation unnecessary	10
Survey in progress	3
Awaiting OVAM warning	11

In the case of *Avelgem WWTP* the orientational soil survey revealed an historical pollution with fuel oil, phthalate and polyaromatic hydrocarbons in the soil and with the heavy metals zinc, nickel, lead, copper, chromium and ammonium in the groundwater. The pollution with heavy metals was not encountered again during the descriptive soil survey. The area polluted with mineral oil was demarcated and appeared to form a serious threat. During 1997-8 a soil remediation project was therefore performed while building work was being carried out at the plant. The contaminated areas were excavated and the soil removed. A subsequent study showed that the remediation work had been sufficiently effective.

At *Deurne WWTP*, soil contamination with mineral oil was detected during the orientational soil survey, as well as groundwater pollution with arsenic, lead, zinc, mineral oil and benzene. Aquafin was warned by OVAM to perform a soil remediation for the contamination with lead, benzene and mineral oil. The descriptive soil survey has now been completed. The remediation is now being combined with renovation work at the plant. The polluted soil is being excavated and removed.

The *plants at Leuven and Mechelen* were both built on dumping sites. Here again renovation work was combined with the remediation of the dump. At Mechelen the spoil from the dump was rearranged in the form of two piles. These were isolated from the subsoil and covered with foil. They are clearly visible from the E-19. The remediation of Leuven proceeded in roughly similar fashion. Both at Leuven and Mechelen the works have now been completed.

At *Nijlen WWTP* the groundwater appeared to be polluted with zinc, nickel, mineral oil, benzene and xylene. Details will be found on page 29.

From initial survey to remediation: Nijlen WWTP

During the orientational soil survey at Nijlen WWTP, pollution of the groundwater was detected: a nickel and zinc contamination in the former sludge-drying beds and mineral oil, benzene and xylene in the underground fuel oil tank.

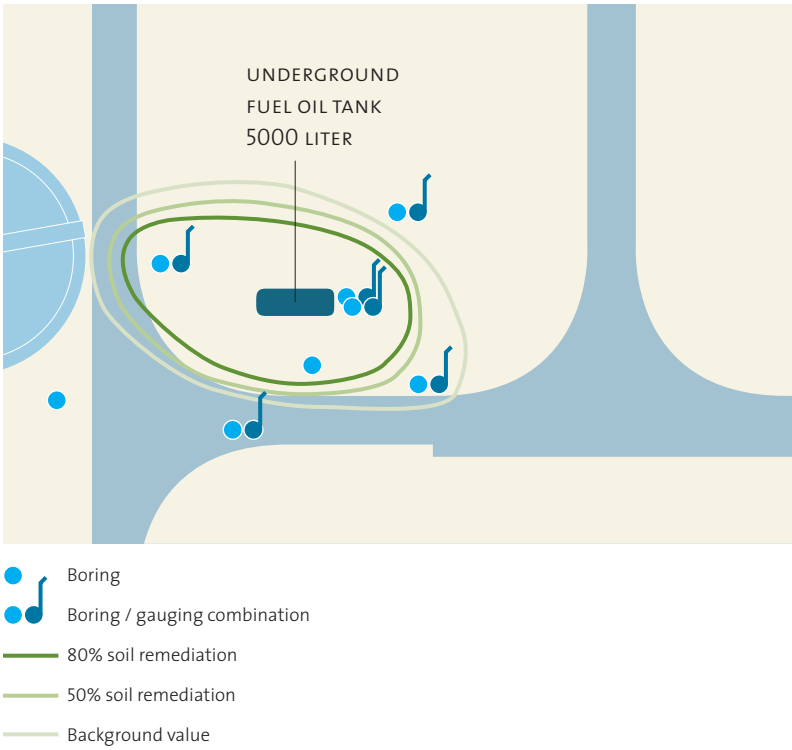
Demarcation of the polluted area

In the descriptive soil survey, the polluted area was demarcated. This process is illustrated here for the pollution with mineral oil. The contours show the point from which the oil concentrations in the groundwater fell below 80% and 50% respectively of the soil remediation norm, and from what point the concentrations fell to background levels (i.e. the levels detectable in an unpolluted soil).

Risk evaluation

After the demarcation of the pollution, a risk evaluation is performed in the context of a descriptive soil survey. In this process the expert checks to see whether the pollution poses a risk for man or the ecosystem and how rapidly it would spread without an intervention.
In the case of Nijlen, no adverse potential effects on public health were identified either for the pollution with heavy metals or for the pollution with mineral oil. In the case of the diesel oil contamination, the most important route of exposure was by evaporation to the interior and exterior air. The anticipated evaporation was, however, below the toxicological norm. For all the polluting parameters the risk of exposure via the groundwater was non-existent, given that, at the site, no groundwater is pumped up for use and there are no nearby water catchments.

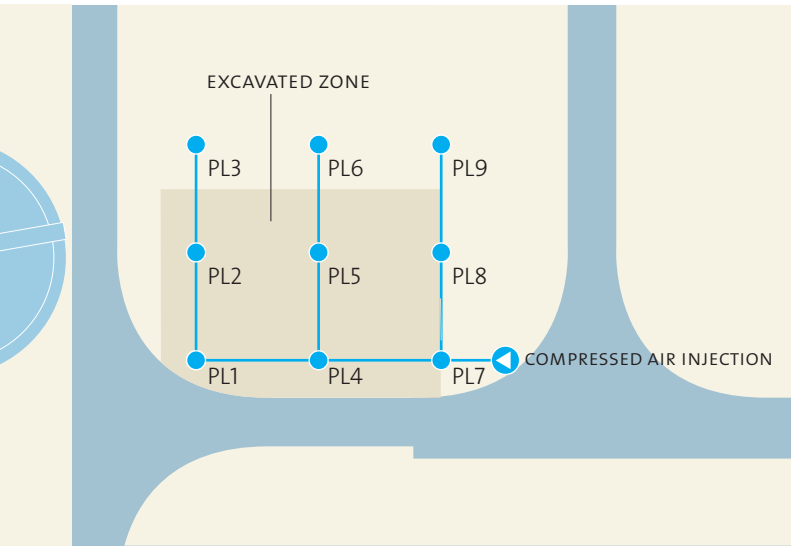
The pollution of the groundwater with mineral oil and BTEX



The pollution will spread primarily via groundwater. The diffusion rate for the polluting parameters was calculated. The pollution is therefore moving extremely slowly: for nickel and zinc the diffusion rate is just 1 mm per year!

Substance	Diffusion rate (in m/year)
Diesel	0.01
Benzene	0.15
Xylene	0.04
Nickel	0.001
Zinc	0.001

Ref: Descriptive soil survey at Aquafin Nijlen WWTP - Tauw.



Phase 1 : Excavation of the polluted soil.
Phase 2 : Remediation of groundwater with biosparging.

Ref: Descriptive soil survey at Aquafin Nijlen WWTP - Tauw.

Remediation

The pollution with metals is historical in nature. As they do not carry any risks, remediation is not required for heavy metals. The diesel contamination that dates from partially before and partially after 1995 must, however, be remediated immediately.

The remediation of the mineral oil has been planned in two phases (see illustrations). In the first phase the polluted soil will be excavated and removed. The groundwater will then be remediated with biosparging. Biosparging is a technique in which air is injected under groundwater level. Thanks to this air injection the water is enriched with oxygen and biodegradation is stimulated. The work will be combined with renovations to the treatment plant. Control measurements will then be performed to check whether the remediation can be regarded as successful. Aftercare measures can also be imposed here if necessary.

Prevention of noise nuisance

All businesses in Flanders and wastewater treatment plants as well have to comply with the noise standards laid down in the VLAREM. To find out whether a plant is making too much noise, measurements are performed at the nearest dwelling or, if there are no houses in the vicinity, at a distance of 200 metres from the plant. Of course, different noise standards apply during the day, in the evening and during the night. The noise standards imposed also depend on the purpose of the building (as stated in the regional plan) and whether the building is located in a quiet or 'noisy' neighbourhood. Water treatment plants used to be built far away from any housing. The risk of noise nuisance was therefore small. Nowadays, however, the requirements of spatial planning demand that structures of this kind be integrated wherever possible into built-up areas, so that as much open space and valley can be spared. This is good for nature but it does, of course, increase the risk of noise nuisance. It is therefore no more than logical that Aquafin should be devoting an increasing amount of attention to prevention of noise nuisance.

32 Noise predictions in the design phase

When Aquafin designs a treatment plant, it estimates its potential noise production. A quite simple computer program provides indications of where measures will have to be implemented to ensure that there is no noise nuisance in the vicinity. In very critical cases, specialists are called in to perform a detailed noise modelling.

34 Noise evaluations during the environmental impact assessment

When the environmental impact assessment (EIA) is drafted, the noise production of the plant in operation is usually measured. These measurements are used to make as accurate a forecast as possible of the noise emissions of the plant after renovations have been performed.

35 Noise measurements and abatement measures

Down the years, Aquafin has had a large number of acoustic surveys carried out by recognized experts. If the acoustic survey suggests that a standard is being exceeded, then noise abatement measures are taken, followed by a checking measurement. We do this if it is clear exactly where the abatement measure has to be implemented. In other cases, we first ask a certified acoustics expert to draw up a noise abatement plan.

36 A knotty problem in Geraardsbergen

Noise abatement is not always a simple matter. In Geraardsbergen, where the treatment plant is located next-door to a nursing home, an exceeding of the noise standard was detected. We therefore had a noise abatement plan drawn up.
The erection of a sound wall reduced the sound radiation to a remarkable extent, but a small motor threw a metaphorical spanner into the works. Surrounding the motor with a sound-insulating cover improved things - but not enough. After replacing the motor however, it was once again quiet and peaceful in Geraardsbergen.

Noise predictions in the design phase

Predictions based on a simple model: Messelbroek WWTP

In the design phase of each treatment plant, a forecast is made on the basis of a simple theoretical calculation. For this purpose, use is made of the normal individual sound powers of the various process components of the planned treatment plant. On the basis of these sound powers, the total noise emission to the environment is calculated. If this is too high then a search is made for ways of meeting the standards. Various scenarios can be compared using this technique.

According to VLAREM, the following noise standards apply at a distance of less than 500 metres from a municipal and public utilities zone: daytime: 50 dB(A), evenings and nights: 45 dB(A). The assumption is that the planned treatment plant should produce at least 5 dB(A) less than that. The specific noise of the plant should therefore not exceed 40 dB(A).

For Messelbroek WWTP, a list of the most important noise sources was compiled: the screw pumps, the motors of the influent pumping station and the sludge recirculation system, the fine screen, the overflow of the selector tank, the aeration unit, the settling tanks, the effluent pit and the recirculation unit, the two spike aerators and their drive mechanism and a distribution structure.

Four noise-sensitive points were selected in nearby plots of land: two in Krekelbroekstraat and two in Brielstraat. The distances between the sources and these points were then measured.

In an initial scenario, it was assumed that the concrete plate on which the aerators were based was large enough to cover the turbulent water surface. If grids for crossing a noise source were fitted, they would be replaced by plates. The effect of these measures on the cost price was negligible. Additional measures were necessary to meet the standards: covering all the screw pumps and the effluent Venturi and streamlining and covering the outflow pits of the settling tanks. The values calculated at the 4 measurement points ranged from 39.6 dB(A) to 32.5 dB(A).

In the second scenario, the effluent Venturi was moved further away from measurement point 2, so that covering it up could be dispensed with. Parts other than those mentioned in scenario 1 had to be covered to ensure that no standards were exceeded. The ultimate values calculated at the measurement points ranged from 40.0 dB(A) to 33.6 dB(A).

In a third scenario, the influent pumping station and the recirculation pumping unit were placed to the south of the aeration basins in order to keep measurement point 1 free of noise nuisance. In this scenario, additional costs had to be incurred because the pipes were longer. Parts other than those mentioned in the other scenarios also had to be covered. The extremes of the calculated values were 39.6 dB(A) and 32.6 dB(A).

In scenario four it was assumed that a noise-abatement measure that could easily be implemented later would only be implemented if subsequent measurements proved that it was absolutely necessary. It ultimately transpired that the only measure that fell under this heading was the covering up of the recirculation pumping unit. Values above 40 dB(A) were obtained.

After weighing up the various noise predictions and the cost estimates, the second scenario was finally chosen.

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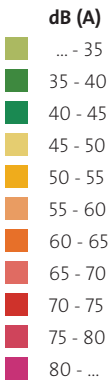


noise predictions for Moorslede WWTP

Acoustical Engineering NV

A thorough modelling of noise production: Moorslede WWTP

For Moorslede WWTP, a very thorough preliminary acoustic study was performed. The calculation used the mathematical model IMMI 5.025. The results were then turned into coloured maps. From the first map it can clearly be seen that if no measures are taken then the plant's nearest neighbours will be in the 45-50 dB(A) zone. The noise standards are therefore clearly not being achieved. The second map shows the noise-abating effect of an earthen wall. An improvement of 5 dB(A) is achieved. The standard of 40 dB(A) is, however, still not being reached. By implementing a whole package of abatement measures the standards will be reached however. This is made clear in the third map.

This study therefore shows that erecting an earthen wall with a height of approx. 3 metres is insufficient. Additional noise-reducing measures, such as covering all the screw pumps, are necessary. The turbulent water zone around the spike aerators must also be fully covered and additional covering at the sides must be provided.

Noise evaluations during the environmental impact assessment

Acoustic measurements near Destelbergen WWTP.

In connection with the planned renovation works at *Ghent WWTP*, a full acoustic survey has been performed during the EIA. No exceeding of standards has been detected. The noise prediction also suggests that sufficient attention was paid to the prevention of noise nuisance at the design stage. No additional noise-reducing measures need be taken. After the renovation, however, a new acoustic survey will be performed.

For the EIA of *Deurne WWTP* a full acoustic survey was performed as well. In the vicinity of the plant there are, however, noise sources (the motorway and the railway shunting station) that actually exceed those of the treatment processes themselves. A modelling of the anticipated noise production of the plant showed that this production will fall after renovation. The brush aerators will be replaced by bubble aeration and the influent screw pumps will be covered.

According to the EIA for *Oostende WWTP*, the noise predictions suggest that no noise nuisance to the environment is anticipated after the renovation work has been carried out.

In order to make an accurate forecast of the noise emissions for the renovation of *Bruges WWTP*, source measurements were performed in the parts of the treatment plant that will remain in operation in the future. For the new parts this information was supplemented with measurement results from other treatment plants. As a mitigating measure, the capping or turning round of the new screw pumping units was recommended, as well as the setting-up of motors inside sound-insulating buildings.

At *Antwerp-South WWTP* acoustic measurements were performed but no exceeding of the standards was detected. No mitigating measures therefore need to be taken other than those already provided for in the renovation project.

Noise measurements

Over the past few years, Aquafin has had a great many acoustic studies performed to evaluate its treatment plants. No exceeding of the standards was detected at the treatment plants at Aalbeke, Wommelgem, Roesbrugge, Zichem, Ieper and Temse. An exceeding of the standards was detected, however, at Kinrooi-Molenbeersel, Spiere-Helkijn, Zolder and Ronse. At Kinrooi-Molenbeersel therefore the influent screw pumps were capped and only one aerator is now in operation during the night. At Spiere-Helkijn a compressor was encased and at Zolder sound-insulating panels were placed around the influent screw pumps. At Ronse both the influent and the recirculation screw pumps were capped. During the checking measurements performed after these abatement measures were implemented, no further exceeding of the standards was noted.

In 2002 noise measurements or abatements were performed at 8 plants. At Schoten, an exceeding of the standard in the influent and sludge return screw pumps was noted, which necessitated the implementation of abatement measures. An acoustic survey after covering the screw pumps showed that the standards were no longer being exceeded.

After an exceeding of the standards was noted during a full acoustic survey of Destelbergen WWTP, the acoustics expert recommended placing sound-deadening plates over the influent and effluent screw pumps. The plates have now been put in place and checking measurements will be performed as soon as measurement conditions are optimal.

At Lo-Reninge WWTP an exceeding of the standard was detected during an initial acoustic survey. This was caused by water splashing from the aerators. The old plant at Lo-Reninge should actually be considered a 'new establishment', because it was taken out of service for a number of years. After an initial attempt at abatement using a wooden acoustic baffle, fresh measurements were performed in which once again an exceeding of the standard was noted. The baffle was therefore replaced with a sound wall. At the beginning of 2003, new sound measurements were performed that showed that the abatement measures had been successful.

At Schoten WWTP the standards were no longer exceeded after the influent screw pumps were covered.

In 2002 there were two complaints about noise nuisance at the treatment plants in Zandbergen and Zomergem, where the influent screw pumps were identified as the most important noise sources. The influent screw pumps at Zandbergen WWTP will be covered during 2003. At Zomergem WWTP, extra attention will be paid to the 'green screen' that has still to be planted, and a sound screen will also be erected around the influent screw pumps. At Alken WWTP, we ourselves performed noise measurements because we anticipated problems with the influent screw pumps. The measurements showed, however, that this fear was unjustified.

The perils associated with the exceeding of the noise standards at Geraardsbergen WWTP are extensively examined in the next section.

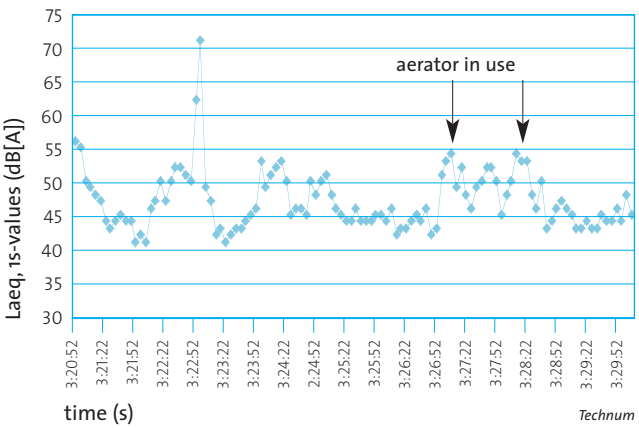
A knotty problem in Geraardsbergen

Geraardsbergen WWTP is located in a municipal and public utilities zone. The old plant was replaced by a completely new one. The plant's noise burden therefore had to be tested against the VLAREM standards for 'new establishments'. Noise measurements were performed at two relevant points: the nearest terraced house and a nursing home. Both buildings are fewer than 500 metres from the municipal and public utilities zone - the house in a residential area and the nursing home in an area of natural beauty. In the evening and during the night the specific noise of the treatment plant must not exceed 40 dB(A).

An initial acoustic survey revealed that the environmental noise during the day was overwhelmingly determined by road- and rail-traffic and by activities of daily living. The specific noise of the treatment plant when it was in operation during the day was not measurable. During the night, however, the plant could be heard and measured. The aerators were responsible for an exceeding of the standard of 5-10 dB(A), depending on the measuring point. An abatement measure therefore had to be implemented.

The abatement plan shows that erecting a sound screen around the aerators was the appropriate sound-reducing measure. That is why the sound wall was erected. Checking measurements show that this achieved a considerable noise reduction - of 18 dB(A). The abatement was successful as far as the residents of the nursing home were concerned. In the case of the house, however, an exceeding of the VLAREM limit was still detectable. The new guilty party appeared to be the motor of the grit chamber. This problem was not noted during

The specific contribution of an aerator



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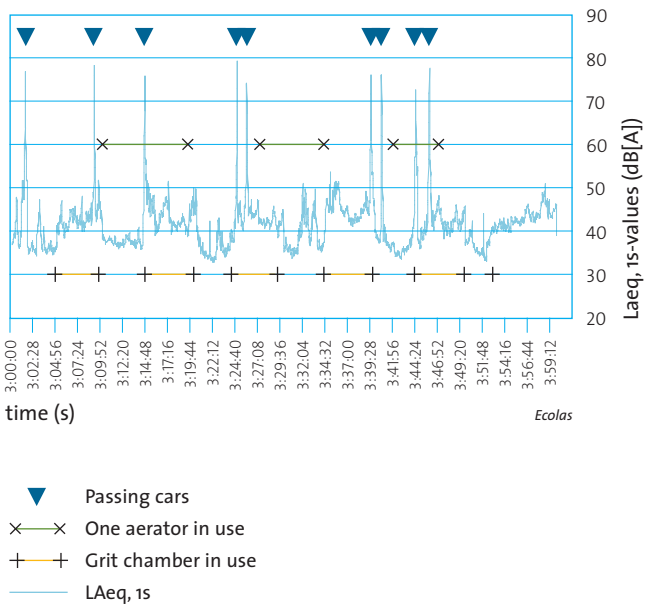
The specific noise of the grit chamber after abatement with a sound wall



Ecolas

the first acoustic survey. The acoustics expert suggested making a reduction in the noise from the grit chamber of at least 10 dB(A). An initial attempt to achieve this reduction involved placing a soundproof casing around the motor. This did indeed achieve a reduction, but an exceeding of the standard by 4-6 dB(A) was still measurable. Ultimately we replaced the motor of the grit chamber. This led to a reduction of 12 dB(A), so that the specific noise of the plant now finally satisfies the VLAREM standards.

Geraardsbergen WWTP. In the background: our very own 'wall of Geraardsbergen'.

Water treatment plants located outside development zones

Aquafin is also confronted with the problem of treatment plants that have been built outside development zones. Sixty-six Aquafin treatment plants are located in such areas. All of them, however, have the necessary permits. Most of them were built many years ago.
However, Aquafin is proposing a regularization programme. Changes of use are urgently required to allow some plants to be renovated and others to be built.

39 Changing perspectives on plants outside development zones

No new building can, of course, take place outside development zones. However, there are already 66 water treatment plants located outside these zones. They are not in any sense illegal, as they all have the necessary building and environmental permits. Obviously, what used to be regarded as compatible with the use defined in the regional development plan now requires regularization.

40 Licensable changes to plants outside development zones

Fortunately the spatial planning legislation makes it possible to license works at treatment plants if such works are necessary for the achievement of the statutory norms. These plants must not, however, be located in areas regarded as 'sensitive' from a spatial planning viewpoint; unfortunately, there are ten plants located in such areas.

41 Changes of use

It is important that changes are made to the use in order to regularize the present situation and to enable new treatment plants to be built. This is best done via the drafting of spatial implementation plans. There are municipal, provincial and regional plans. In certain cases, the municipality can also change the use by drawing up a 'BPA', a 'special planning scheme'.

43 The siting of treatment plants in the VEN area

The first areas of the Vlaams ecologisch netwerk (Flemish ecological network - the VEN) were provisionally demarcated in 2002. At the public enquiry stage Aquafin submitted an objection, requesting that the sites of 10 currently operational treatment plants be withdrawn from the VEN area.

Changing perspectives on plants outside development areas

In a regional plan, the use of each area of land is specified. Possible uses include agriculture, housing, industry & SME, and nature reserves. Down the years these regional plans have been changed repeatedly. The use of every place in Flanders as specified by the regional plan can be found on the website of GIS-Vlaanderen (www.gisvlaanderen.be/geo-vlaanderen/gwp/). The municipalities can also change this use via an approved BPA (see above).

Wastewater treatment plants must be built in an area to which such a purpose has been assigned. Everyone agrees on this. Down the years however, a change in attitude has been observable regarding which uses are appropriate and which are not. Many older treatment plants, for example, are located in agricultural areas. Some are even located in the middle of nature reserves. They were not, however, built without the necessary permits. All Aquafin treatment plants, with one exception, hold one or more building and environmental permits. These permits invariably state that location outside the development zones was acceptable under section 20 of the Royal Decree on regional plans. This exceptional provision made it possible to issue permits to public services and municipal facilities despite contrary uses being specified in the regional plans as long as they were compatible with the general purpose and architectonic character of the area concerned. A plant located in, for example, an agricultural area used to be accepted without demur.

Sint-Martens-Latem SWWTP is situated in a nature reserve.

Nowadays, however, this interpretation is utterly different. A plant is assumed to lie in a zone for municipal facilities and public utilities, a residential area or perhaps in an industrial zone or SME zone, at least if industrial wastewater is also processed at the plant. In the recent past, changes were accordingly made to the regional plan. In the future this can only be done by means of municipal, provincial or spatial implementation plans. For some plants built in the past, this change of use has not yet been made. For all existing plants and for those yet to be built, an inventory has therefore been performed for each river basin showing the level at which the matter will be handled (municipal, provincial or regional). In due course the uses of these sites will be changed into an ‘area for municipal facilities and public utilities’, with the use shown as 'water treatment'. During this procedure advice will be taken from advisory and licensing bodies and a public enquiry will be held.

Licensable changes to plants outside development zones

Brakel WWTP is located in VEN area and in a nature reserve.

For 66 existing plants the present use is wholly or partially out of line with the desired use. Sometimes 95% of the plant is located within a development zone and the other 5% outside it. As long as the plants are not located in sensitive areas from a spatial planning viewpoint and renovation/expansion is required to meet the terms of the European Urban Wastewater Directive, the spatial planning legislation allows the works to be licensed. A good reason for the renovation/expansion must accompany the urban development application. This is why Aquafin was able to place iron chloride tanks at treatment plants located in agricultural areas. The placement of these tanks was necessary to adapt the plants for chemical phosphorus removal. Thanks to this measure, the phosphate norm could be temporarily achieved at those treatment plants where the EU Urban Wastewater Directive imposed it.

Noise emission standards, however, are just as heavily dependent on the building schemes. Within 500 metres of a municipal facilities and public utilities zone the noise emission standards are higher than they are in, for example, agricultural areas. Soil remediation standards are also dependent on the use. Building plants outside development zones therefore has many consequences.

Changes of use

Changes at regional level

Treatment plants that are eligible for such changes are plants with a treatment area that is located in two provinces, in a regional urban area, in a port area, in an urban network, in a metropolitan area, within the network of the Albert Canal or within the network of the national airports. These areas will be demarcated by the Flemish Region in a regional RUP (spatial implementation plan). At present, 19 treatment plants in this category have been inventoried.

Melsbroek WWTP will be processing a part of the wastewater from the airport of Zaventem and therefore comes under regional authority as regards spatial planning. A regional RUP will therefore be drawn up by the Flemish Region. As soon as the desired location has been earmarked as a municipal facilities and public utilities zone, the urban development permit and the environmental permit can be applied for. Only when these permits have been received can a start be made on building the treatment plant.

Another example is Harelbeke WWTP. This plant is largely but not entirely located in a municipal facilities and public utilities zone. The banks of the Leie are, of course, an area of outstanding natural beauty. Regularization may be possible by including the treatment plant within the area demarcated by the regional urban area of Kortrijk.

Changes of use at provincial level

Treatment plants eligible for such a change have a treatment area located in more than one municipality, at a specific economic node, in a small-town area or in a structurally-supportive small-town area. The demarcation is made at provincial level via the creation of a provincial spatial implementation plan. Forty-eight existing and planned plants have been inventoried at this level. The Zwalm WWTP, for example, is located in a nature reserve - a 'sensitive' area from a spatial planning perspective. The situation must be regularized before an urban development permit for possible expansion can be applied for. Given that this plant also abuts on an area covered by the EU Habitats Directive, a suitable assessment must also be made that makes due allowance for this Directive. An examination will have to be made to see whether significant effects on the protected habitats and species could occur during the execution of the works and the operation of the renovated treatment plants.

Zwalm WWTP situated on the regional plan.

Borders of the area covered by the EU Habitats Directive and position of Zwalm WWTP.

Such effects can, for example, arise as a result of a lowering of the groundwater level during drainage, disturbance of the peace during works, and the discharge of pumped water into a watercourse. The competent authority will evaluate the likely effects and perhaps impose mitigating measures.
The plant also borders on a proposed VEN area.

Demarcation of the VEN-area and Zwalm WWTP.

In both the demarcation of the EU Habitats area and the provisional demarcation of the VEN area, allowance has been made for the existence of a treatment plant. This plant treats the wastewater from various municipalities and therefore falls within the competence of the province.

Changes of use at municipal level

The new plant at Wingene was sited in an agricultural area. The use was accordingly changed into a public utility zone by the 'Veldbeek' special planning scheme of 26 March 2002. An urban development permit can now be applied for. The treatment area is almost entirely located within the municipality of Wingene and therefore a municipal matter. The location has been carefully chosen. The plot on which the plant is situated adjoins two industrial premises, so no further 'chipping away' at open spaces is required.

Spatial situation of Wingene WWTP on a topographical map.

Colouring on the 'BPA', a special planning scheme.

In the zone where the building and constructions are located (blue on the map) the building height is limited. The undeveloped surface within this zone must be laid out as a green zone.
Around this zone a buffer zone has been demarcated (green). To this there apply, among other things, regulations for planting and for the type and height of the enclosure. This buffer zone will help to maximally integrate the treatment plant into the landscape. The trees and shrubs to be planted must be indigenous and native to the region.

Location of treatment plants in a VEN area

Tongeren WWTP (1987)

The purpose of the VEN (Flemish Ecological Network) is to protect and further develop open spaces and nature values. The first areas have been provisionally demarcated and a public enquiry organized for them. Grote Eenheden Natuur (Large Nature Units - GEN) and Grote Eenheden Natuur in Ontwikkeling (Large Nature Units in Development - GENO) form part of this VEN: within these areas allowance must be made for the provisions of the Nature Decree. In these provisional demarcations allowance has not always been made for the existing infrastructure, so that certain existing treatment plants have ended up inside the VEN. Ten sewer water treatment plants are located within the provisional demarcation of a VEN area. For these treatment plants, an objection was submitted during the public enquiry stage. The procedure for the definitive demarcation of these proposed VEN areas is still in progress.

Certain works in GEN or GENO are subject to a ban, for which an exemption can however be requested.
An example of this is Tongeren WWTP, built in 1987 in a nature reserve and now also within the provisional demarcation of a VEN area. This treatment plant of 15,500 PE has valid urban development and environmental permits. The technical plans for the renovation were approved by the Flemish Minister of the Environment on 10 September 2002. Aquafin has therefore submitted an objection with a request that the plant be removed from the VEN area.

Tongeren WWTP is located in a nature reserve on the regional plan.

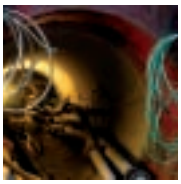
Tongeren WWTP is also located in VEN area.

Working on the future

The EU's Urban Wastewater Directive obliges the Flemish Region to collect and treat its domestic wastewater. In the case of agglomerations of more than 10,000 PE (population equivalents), phosphorus and nitrogen also have to be removed from the wastewater. For agglomerations between 2,000 and 10,000 PE, a biological treatment without nutrient removal is usually sufficient. The necessary remediation work is either already in full swing or has been planned. In addition, in 2002 new treatment plants were built and older ones renovated. The development of the trunk sewer network continued.

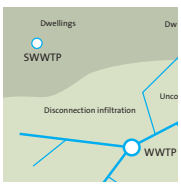
46 Continued expansion and renovation of the treatment plant network

At the end of 2002, Aquafin had 199 already-delivered treatment plants in operation. These included six new plants that were delivered to the Flemish Region during the course of the year. Between them these plants have a design capacity of 95,400 PE. Four other plants were thoroughly renovated and converted for nitrogen removal.



50 Collecting wastewater

In 2002, Aquafin took into service an additional 57 pumping stations and 163 km of new principal sewers. This brings the new totals under Aquafin's management to 3,662 km of principal sewers and 749 pumping stations. 1,189 trunk sewer projects have been executed and delivered to the Flemish Region since Aquafin was founded. A further 239 trunk sewer projects are still in execution, while 503 are still at the design stage.



51 Masterplanning: what is to be done first?

In 2001, Aquafin established a methodology for optimizing investment planning for water treatment. In 2002 the methodology was further operationalized and applied to the first set of 21 treatment areas.

54 RIO*Totaal*, a blueprint for the development and management of the municipal sewer system

The municipalities are now acquiring more responsibilities and tasks within the framework of the integrated water management policy. Aquafin is now offering them its **RIO***Totaal* service package, a tool that is tailored to the specific requirements of each municipality and which contains modules for the development and management of the municipal water treatment infrastructure.

Continued expansion and renovation of the treatment plant network

Aeration basin at Merelbeke WWTP.

At the end of 2002, Aquafin had 199 already-delivered treatment plants in operation. These included 6 new plants that were delivered to the Flemish Region during the course of the year. Between them they have a design capacity of 95,400 PE. Four other treatment plants were thoroughly renovated. Gavere WWTP (9,000 PE) and Zomergem WWTP (5,400 IE) are operational, but not yet delivered to the Flemish Region.

New WWTPs in 2002	Capacity in PE
Alken	14,400
Menen	59,400
Merelbeke	14,400
Gelmen	5,400
New SWWTPs in 2002	**Capacity in PE**
Parike	1,170
Pervijze	630
Renovations in 2002	**Capacity in PE**
Hamme	27,000
Tienen	26,100
Turnhout	74,700
Woumen	16,200

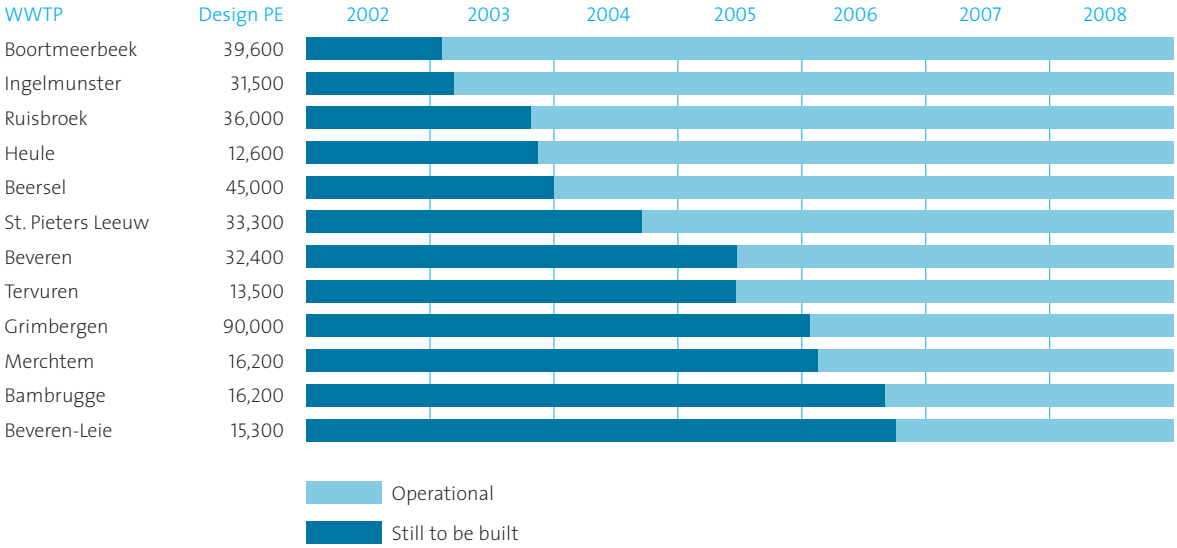
Plants with a capacity > 10,000 PE

The Vlaamse Milieumaatschappij (VMM) identified 114 agglomerations of more than 10,000 PE in the Flemish Region. The EU Urban Wastewater Directive says that if these agglomerations are located in 'sensitive areas' then they must be equipped with a biological treatment facility with nutrient removal by 31 December 1998. By nutrient removal is meant the removal of nitrogen and phosphorus. On 1 August 1995 the whole of Flanders was designated a 'sensitive area'. Since then, Aquafin has been involved in a race against time to renovate the older treatment plants and to build those that are still lacking. In 1998-1999, iron chloride tanks were installed to be able to meet the norms for 'total phosphorus' via chemical dephosphorization - a relatively simple technique that was implemented rapidly wherever it was needed. For nitrogen removal, however, the conversion work is more extensive; projects for this task have been placed on the renovation investment programme. Thanks to the building and renovation of treatment plants, 86 of the 114 agglomerations with more than 10,000 PE now meet the stated requirements in full.

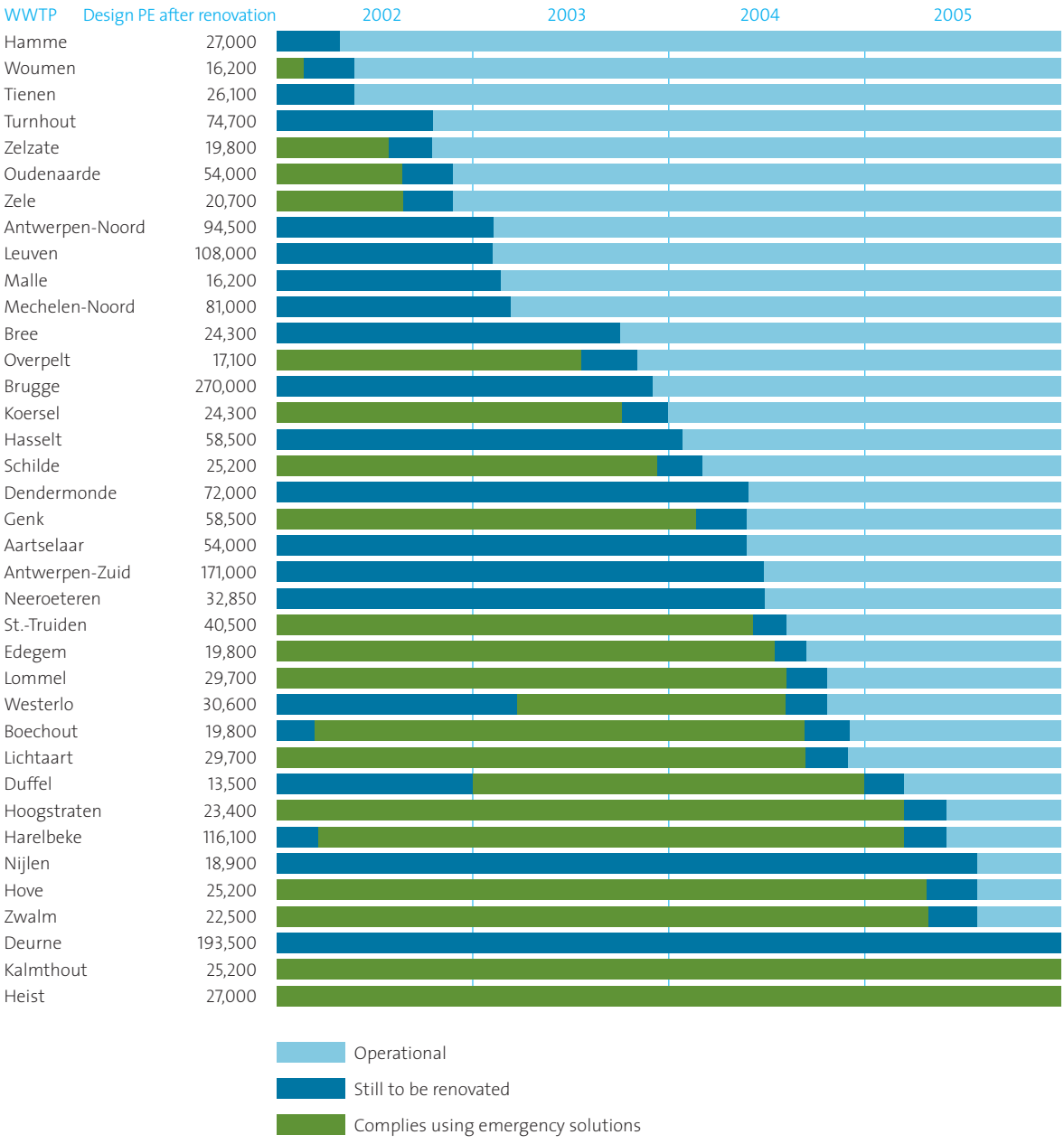
Even so, 12 new wastewater treatment plants still have to be built in agglomerations of more than 10,000 PE. Half of these plants, which account for close on 200,000 PE between them, are currently under construction. The design of one of them is being reexamined. One remaining problem is that the building of five of these treatment plants is still being delayed by problems with obtaining town planning or environmental permits or because of site acquisition problems.

In 2002, four renovations of treatment plants in agglomerations of more than 10,000 PE were delivered to the Flemish Region. The work on three other renovations - at Zelzate, Oudenaarde and Zele - has now been

Timing building of WWTPs in agglomerations > 10,000 PE



Timing WWTP renovation projects in agglomerations > 10,000 PE



Open day at Hamme WWTP, 30 June 2002.

Sample taking at Gavere WWTP.

completed, but delivery to the Region has yet to take place. 14 renovations are in full swing. The work on 12 other renovations has been contracted out or is at the tendering stage. Three renovation projects are still in the design phase. For approximately half the treatment plants that still have to be renovated, emergency solutions have been worked out, thanks to which they already meet all the effluent norms.

Treatment plants between 2,000 and 10,000 PE

In the Flemish Region there are, according to the Vlaamse Milieumaatschappij (VMM), 84 agglomerations of between 2,000 and 10,000 PE. The EU Urban Wastewater Directive says that these agglomerations must be equipped with a biological treatment facility by 31 December 2005.

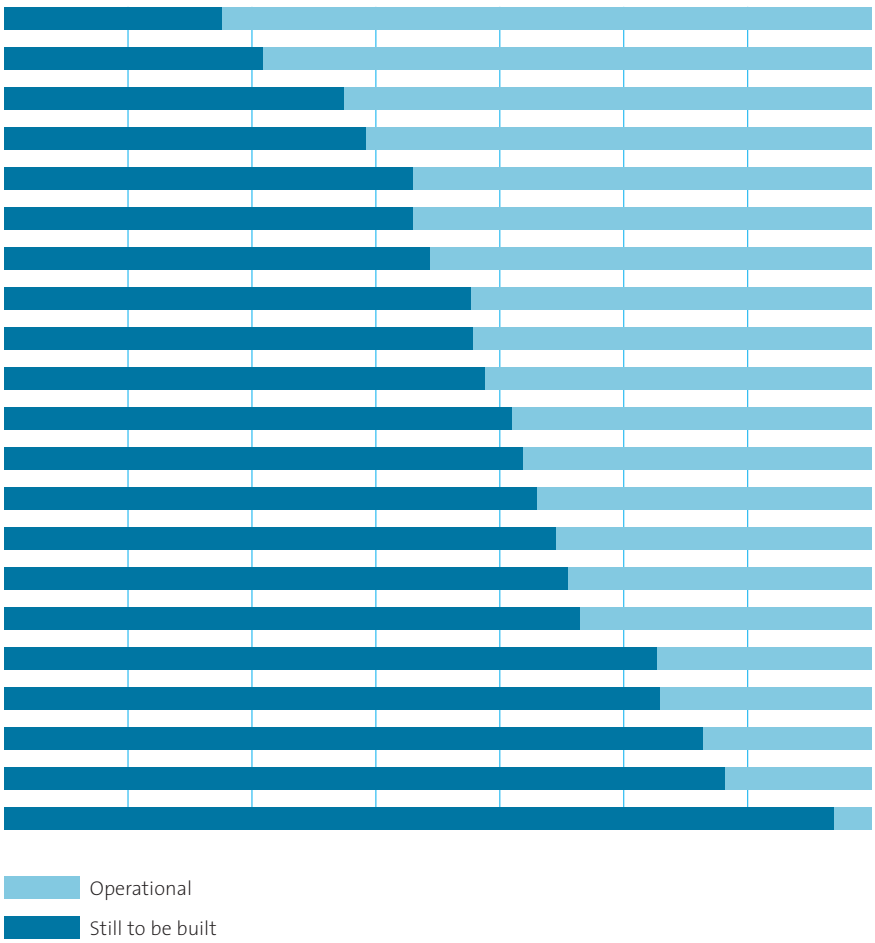
On 1 January 1994, Aquafin took over responsibility for operating all the existing treatment plants from the VMM. 23 of these former VMM plants are located in agglomerations of between 2,000 and 10,000 PE. They all meet the norms for BOD, COD and suspended solids (based on the pollution load currently being fed to them and the present level of pumped discharge). For some plants, renovation has been planned. In most cases this is necessary because at the end of 2005 these plants are being assigned nutrient norms as a special condition of their environmental permits.

Since 1991, Aquafin has built 36 plants with a design capacity between 2,000 and 10,000 PE. These plants meet all the legal norms. Two plants are currently under construction: Boekhoute WWTP and Steenokkerzeel-Noord WWTP. Construction of the remaining plants is encountering some difficulties. In as many as 16 cases, construction has been delayed because of problems with obtaining town planning or environmental permits or because of problems with land acquisition.

Influent and effluent sample Tienen WWTP.

Timing building of WWTPs in agglomerations between 2,000 and 10,000 PE

WWTP	Design PE
Boekhoute	3,060
Steenokkerzeel-Noord	3,600
Waardamme	3,600
Kampenhout	6,300
Moorslede	5,400
Olsene	18,900
Oosterzele	9,900
Geetbets	4,950
Humbeek	3,060
Pittem	4,500
Beernem	7,200
Roosbeek	2,880
Messelbroek	5,940
Berendrecht	8,100
Melsbroek	?
Sint-Joris-Winge	5,040
Hoepertingen	3,420
Melle	9,000
Ledegem	8,100
Oplinter	3,870
Wingene	4,050



Collection of wastewater

Thrustboring of a trunk sewer under the river Dijle in Mechelen.

According to the EU's Urban Wastewater Directive, all agglomerations - even those with fewer than 2,000 PE - must be collecting their wastewater by 31 December 2005. Agglomerations larger than 10,000 PE should already be doing that.

In 2002, Aquafin took into service an additional 57 pumping stations and 163 km of new principal sewers. This brings the new totals under Aquafin's management to 3,662 km of principal sewers and 749 pumping stations. 1,189 trunk sewer projects have now been executed and delivered to the Flemish Region. A further 239 projects are still in execution, while 503 are still at the design stage. A major problem in the expansion of the trunk sewer network is the delay in the execution of the municipal investment programmes. One result of this is that the building of a number of Aquafin trunk sewers has been postponed because there is as yet no pollution load that can be immediately taken up.

Masterplanning: what is to be done first?

By 2001 Aquafin had already developed a methodology for optimizing investment planning in the water treatment infrastructure. In 2002, this 'Masterplan' methodology was further operationalized and applied to the first set of 21 pilot treatment areas.

The project basket

This Masterplan contains all the projects that must be performed to achieve the desired target level of water purity in these pilot areas. It is envisaged that this expansion will be achieved via separated sewer systems. Projects for optimizing the existing infrastructure are also included in the Masterplan. This could lead a.o. to the deduplication of existing mixed sewers to form separated sewers, the solving of flooding problems and the optimization of the functioning of overflows.

The projects are defined using ecological, economic and social scenario analysis. This form of analysis determines the optimum way of achieving a specific project goal while making due allowance for the infrastructure that is already in existence. For the remediation of a discharge point, for example, connection to a large-scale treatment plant is weighed up against connection to a small-scale plant. Given that each of these projects is allocated an investment cost, it is also possible to deduce from this analysis the value of the investments required.

An analysis of the results of the exercise performed in 2002 reveals a total planned investment of EUR 1.868 billion for the 21 areas. This investment is accounted for by a remediation of 263,000 PE, a net disconnection of 97.21 l/s of parasitic discharge, a net disconnection of 952.67 hectares of paved surfaces and the development of 97,945 m^3 of storage to reach the desired target situation.

The projects in the Masterplans can be arbitrarily classified as follows:

Category	Description / Identification
A. Treatment plants	Projects in which the building, renovation or expansion of a large-scale or small-scale water treatment plant are planned.
B. Projects for the connection of pollution load	Projects in which PE are connected.
C. Projects for the disconnection of parasitic discharges	Projects in which no PE are being connected but in which some disconnection of parasitic discharges is performed.
D. Projects for the disconnection of paved or unpaved surfaces	Projects in which no PE are being connected, no disconnection of parasitic discharges is being performed, but where there is a disconnection of (paved or unpaved) surfaces.
E. Projects for the expansion of storage	Projects in which no PE are connected, no disconnection of parasitic discharge is performed, no disconnection of paved surfaces is planned and in which a positive storage is realized with a view to the reduction of the overflow frequency.
F. Hydraulic projects	All other projects. These are projects without direct ecological benefit but which are necessary to eliminate the nuisance to society caused by flooding.

If the total value of the planned investments within the present masterplan of the 21 areas is subdivided into these different categories we arrive at the following values.

Category	Value of planned investments (in millions of euros)	%
A. Treatment plants	24.4	1
B. Projects for the connection of pollution load	1,000.5	54
C. Projects for the disconnection of parasitic discharges	252.7	14
D. Projects for the disconnection of paved surfaces	454.8	24
E. Projects for the expansion of storage	36.3	2
F. Hydraulic projects	99.1	5

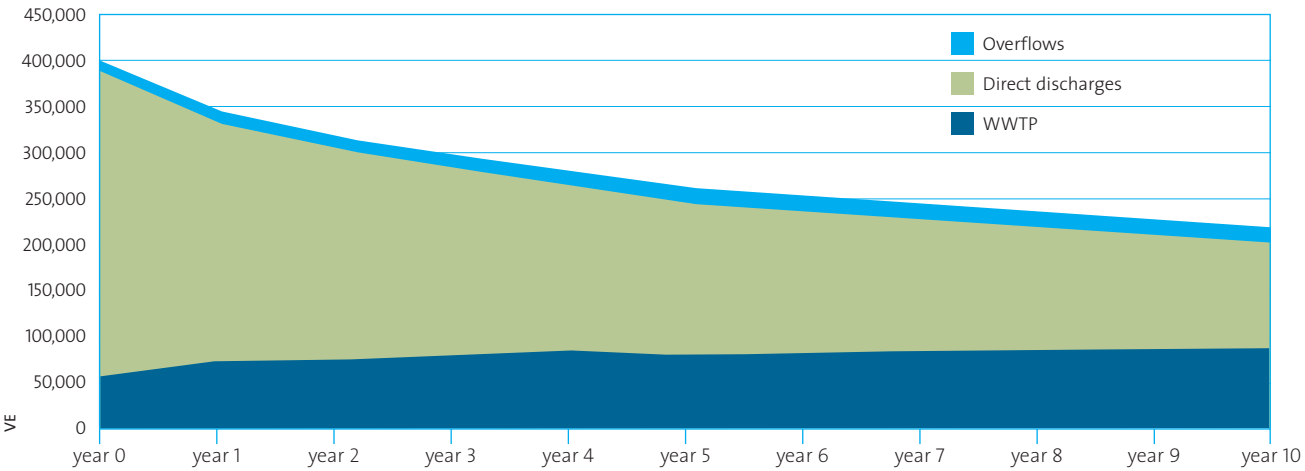
To simplify, it can be stated that the projects in categories A, B and F are concerned with the connection of pollution load (where appropriate in the form of separated systems). This accounts for 60% of the necessary investments within the areas under investigation. The other categories relate to qualitative optimization of the existing infrastructure (disconnections, storage, etc.) and account for 40% of the necessary investments. It should also be remarked that this proportion can, of course, differ very substantially from area to area, e.g. due to the varying levels of development of the system. It is accordingly not possible to automatically extrapolate these values to the whole of Flanders.

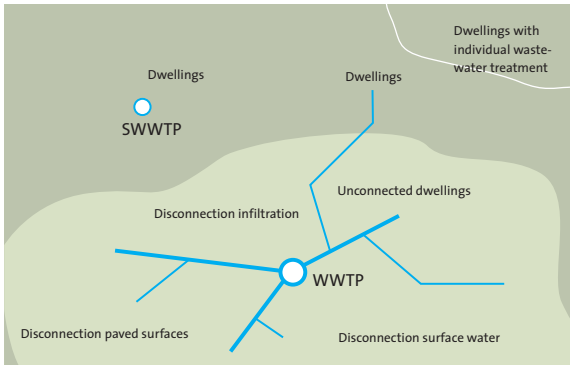
Ranking of the project basket

The second phase of the masterplan methodology aims to determine the optimum sequence in which the projects from the basket must be realized. The optimum sequence is that in which there is a minimum pollution emission to the watercourse from the present time until the completion of all the necessary infrastructure. This optimization process is calculated via linear programming.

For the 21 areas studied the following trend in pollution load discharged to the watercourses is obtained (the pollution load is expressed here via the parameter PU or pollution units):

Reduction in PU using an optimum project sequence





Outer area

Area with existing treatment infrastructure

One of the conclusions that can be drawn is that, by connecting pollution load to a treatment plant, the PU emission due to direct discharges is substantially reduced while the PU emission due to an increase in the effluents from the treatment plants increases slightly.
It is also interesting to look at the prioritizing in the light of the project categorization mentioned above. The composition of the annual project basket for the first ten years looks like this:

The construction of RWF facilities in streets where sewering already exists (cat. D) will be relatively less profitable in the early years. The realization of such projects in the short term can, however, be inspired by other priorities such as, for example, the reconstruction of a mixed sewer to form a separated sewer as a result of structural defects. This aspect, however, falls outside the scope of the Masterplan exercise.

Category	Year 1 (%)	Year 2 (%)	Year 3 (%)	Year 4 (%)	Year 5 (%)	Year 6 (%)	Year 7 (%)	Year 8 (%)	Year 9 (%)	Year 10 (%)
A	0	22	14	0	1	1	0	1	1	0
B	63	60	75	79	84	85	85	95	86	93
C	13	3	5	2	5	4	6	1	5	1
D	1	0	1	2	2	1	4	2	7	6
E	12	7	1	2	0	3	2	0	0	0
F	12	9	4	16	7	6	3	1	1	1

It is obvious that projects that involve the connection and treatment of pollution load (cat. A and B) will take up a relatively large share of the basket over the next few years. In the first year, however, a number of very profitable disconnection projects of parasitic discharges can also be realized (cat. C). These are mostly projects in which the parasitic discharges can be disconnected at concentrated locations at relatively low cost. The expansion of storage (cat. E) at certain locations also appears to have a good level of profitability, which will result in relatively high percentages during the first few years. The incidence of projects from category F depends on their hydraulic necessity following the realization of the other projects.

Policy

It is clear that the outcome of the prioritizing process depends on the policy objectives. From that perspective, the methodology and parameters used during 2002 were discussed with the Flemish Region and approved in principle, subject to a few minor adjustments. These adjustments will be made in 2003, after which the methodology will be used in other areas. The results of these studies should make it possible to define sensible and high-priority projects for inclusion in the various investment programmes for the water treatment infrastructure.

RIO*Totaal,*
a blueprint for the development and management of the municipal sewer system

The **Rio***Totaal* service package is a technical and conceptual tool developed by Aquafin and tailored to the needs of the municipality for the realization of the future vision of an integrated sewer policy. The package comprises modules for the further development and management of the sewer system. Thanks to its modular structure, the municipality can access the package at any individual module, depending on its needs. The added value of **Rio***Totaal* lies in the continuous interaction between the different modules.

Towards full development of the sewer system...

Rio*Herrekening* (TRP-herrekening)

The first step in a **Rio***Herrekening* (literally, 'SewerCalculation') is the construction of a sewer database from the available information (Total Sewering Plans, execution dossiers, etc,) and measurements. Using this database, the behaviour of the existing sewer system is then analyzed in a model.

An optimum status for the sewer system is then worked out in various steps in conformity with the Code of Good Practice. In this process, allowance is made for the expansion of the sewer system to cope with the remediation of the remaining discharge points and for interaction with the watercourses. The integrated approach also makes it possible to identify which actions will be necessary to disconnect from the sewer network streets, squares, large car parks and canals. **Rio***Herrekening* also closely examines the hydraulic problems in the existing status, such as flooding or ecological problems associated with the functioning of overflows.

Rio*Herrekening* supplies ready-made solutions in the form of a concrete action list with all the necessary investments (new sewers for the connection of discharge points, disconnection of canals and paved surfaces, local interventions for the solution of flooding problems or a reduction in the overflow frequency). At the same time the digital database created can be used - for example - for the digital management of the sewer network or for the drawing up of a maintenance plan (**Rio***Plan*).

Rio*Investering*

The **Rio***Investering* ('SewerInvestment') module uses the action list from **Rio***Herrekening* to create an investment programme of new projects within a realistic timeframe (5, 10 or 15 years). In this process, allowance is made not just for the financial strength of the municipality but also for the ecological and social priorities (e.g. timing of the upgrading of the road network, siting in an ecologically valuable environment, etc.).

Additionally, Aquafin can handle the preparation of the documents required for the subsidy applications for the proposed projects.

Rio*Project*

For subsidizable municipal sewer projects, many municipalities are already resorting to the RIO-2 supervision that Aquafin provides and which the Flemish Region offers. The **Rio***Project* module complements this guidance perfectly. Within this module the municipality can conclude an agreement with Aquafin for legal, administrative and technical advice in the appointment of an engineering consultancy and in the tendering, awarding and delivery of the project. The municipality can also contract out to Aquafin's specialists the negotiations for site acquisitions and/or the daily supervision of the works.

Towards an effective management of the existing sewer network

Rio*Plan* (Hydroplan)

The **Rio***Plan* module keeps the sewer system – the subterranean 'treasurehouse' that every municipality possesses – in tip-top condition. **Rio***Plan* identifies the critical points of the sewer system. The analysis of consequential damage, combined with a hydraulic, structural and ecological risk analysis, finds ultimate expression in a cost-effective sewer management plan. This plan comprises the supervisory and maintenance scheme (inspection, clearing, renovation of seams and joints) that is required to ensure an adequate functioning of the sewers. Thanks to the ageing analyses, 'sudden' collapses of sewers become a thing of the past. The municipality then has a solid basis for planning and budgeting the renovation projects proposed in the **Rio***Plan*. **Rio***Plan* answers the following questions: what is the present status and condition of the sewer system, what is its remaining service life, and which sewer pipestrings have to be checked, maintained, renovated or replaced (and when) in order to maintain or improve the quality of an existing sewer system cost-effectively.

Rio*Financieel*

Rio*Financieel* matches the maintenance scheme and the renovation projects from the sewer management plan to the available budget of the municipality. Several scenarios can be worked out, e.g. resolving priority problem areas only, achieving a consistent quality in the sewer system, bringing the sewer system to a perfect condition, etc. This process gives rise to a rolling sewer management programme with a timeframe of 10-15 years.

Rio*Exploitatie*

With **Rio***Exploitatie* ('SewerOperation') the municipality entrusts to Aquafin the management of critical points in the sewer system (small-scale treatment plants, pumping stations, overflows, valves, important sewer pipestrings). The module also includes an emergency check on the vital parts of the municipal sewer and on the processing of the sludge from these installations. By drawing on Aquafin's expertise, the municipality opts for a results-oriented, environmentally responsible operation of its sewer system.

With **Rio***Exploitatie* a municipality can also make unforeseen savings. Suspiciously high peaks in a pumping station, for example, can point to the existence of as yet unknown connections between canals and the sewer system. Thanks to a rapid identification of trouble spots, a steeply rising energy bill can be avoided.

Rio*Gis* en Rio*Management* keep the wheel turning

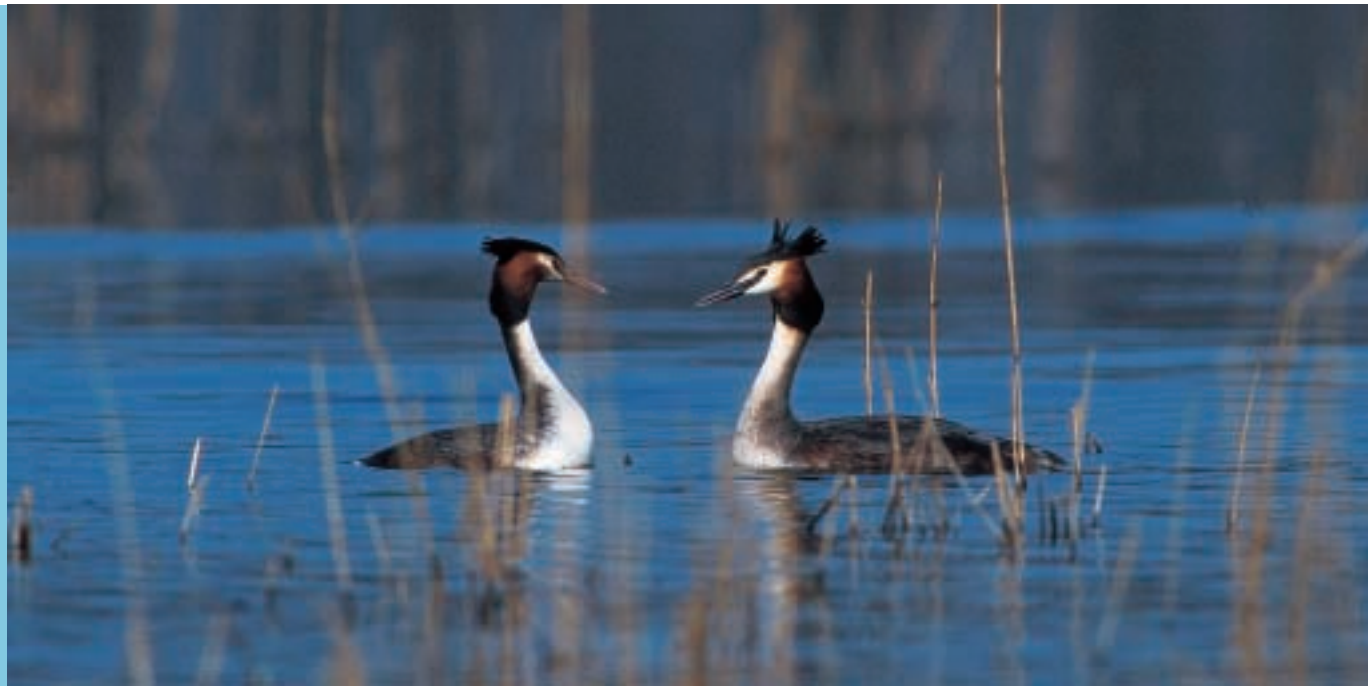
Rio*Gis* (AquaGIS)

Rio*Gis* is a program developed by Aquafin for the management of a sewer database (as constructed within the context of, for example, a **Rio***Herrekening* or a **Rio***Plan*). This central database contains all the basic information about the sewer system and so forms a very useful tool not only for the technical departments of the municipalities but also for the fire brigade and civil defence. Because this database works within a GIS environment, the desired information can be visualized against any background map. Provided that it is kept systematically up-to-date and takes into account any changes in the sewer system, this software allows for a fully digital management of the sewer system (including the management of domestic connections).

Rio*Management*

Rio*Management* is an integrated service module in which aftercare and feedback to the other **Rio***Totaal* modules occupy a central place. **Rio***Management* covers, among other aspects, quality assurance, site supervision and land acquisitions for non-subsidizable projects, hydraulic advice on connections to the municipal sewer infrastructure, the updating of a digital sewer database, the drawing up of documents for subsidy applications for municipal sewer projects and much more besides. In a nutshell: it is custom work placed at the service of the municipality.

Report of the statutory auditor
Balance sheet and profit and loss account
Social balance sheet



Report of the statutory auditor

on the financial year ended 31 december 2002
to the shareholders of Aquafin's meeting

In accordance with the legal and regulatory provisions we report on our audit engagement which you have entrusted to us.

We have examined the financial statements for the year 2002 ended 31 December 2002 which have been prepared under the responsibility of the Board of Directors which show a balance sheet total of EUR 1,928,667 thousand and a profit for the year of EUR 11,502 thousand. In addition we have carried out specific additional audit work required by the law.

Unqualified audit opinion on the financial statements

Our examination has been conducted in accordance with the auditing standards of the 'Institute des Reviseurs d'Entreprises'. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement and are in compliance with the Belgian legal and regulatory requirements with respect to financial statements.

In accordance with these standards we have taken into account the administrative and accounting organisation of the company as well as the procedures of internal control. The responsible officers of the company have clearly replied to all our questions for information and explanations. We have examined on a test basis, the evidence supporting the amounts included in the financial statements. We have assessed the accounting policies used, the significant estimates made by the company and the overall presentation of the financial statements. We believe that our audit provides a reasonable basis for our opinion.

In our opinion, taking into account the legal and regulatory requirements which are applicable to them, the financial statements present fairly the financial position of the company as of 31 December 2002 and the results of its operations for the year then ended and the information given in the footnotes is properly presented.

Additional certifications

We supplement our report with the following certifications which do not have any impact on our audit opinion on the financial statements:

- The directors' report includes the information required by the law and is in accordance with the financial statements.
- Without prejudice to certain formal aspects of minor importance, the accounting records are kept in accordance with the applicable Belgian legal and regulatory requirements.
- No action or decision taken which does not comply with the Company Law or the statutes needs to be reported to you. The result appropriation proposed to the General Meeting complies with the law and the statutes.

Gent, 30 April 2003

Ernst & Young Reviseurs d'Entreprises S.C.C. (B 160)
Statutory auditor
represented by
Rosita Van Maele
Partner

Balance sheet after profit sharing

Assets (000 euro)		31 december 2002	31 december 2001
Fixed assets		**1,592,229**	**1,422,767**
III	**Tangible assets**	**1,589,819**	**1,421,038**
	A. Land and buildings	42,748	34,654
	B. Plant, machinery and equipment	1,227,965	1,089,873
	C. Furniture and vehicles	967	1,205
	D. Leasing and other similar rights	2,900	3,119
	E. Other tangible assets	461	778
	F. Assets under construction	314,778	291,409
IV	**Financial assets**	**2,410**	**1,729**
	A.1. Participating interests	2,357	1,681
	C.2. Amounts receivable and cash guarantees	53	48
Current assets		**336,438**	**256,123**
VI	**Stocks and contracts in progress**	**2,643**	**2,410**
	B. Contracts in progress	2,643	2,410
VII	**Amounts receivable within one year**	**332,174**	**249,116**
	A. Trade debtors	89,567	23,482
	B. Other amounts receivable	242,607	225,634
VIII	**Investments**		**2,974**
	B. Other investments and deposits		2,974
IX	**Cash**	**84**	**788**
X	**Accruals**	**1,537**	**835**
TOTAL ASSETS		**1,928,667**	**1,678,890**

Liabilities (000 euro)

		31 december 2002	31 december 2001
Shareholders equity		**399.144**	**345.079**
I	Capital	**99.426**	**99.426**
	A. Issued capital	198.400	198.400
	B. Uncalled capital	-98.974	-98.974
IV	Reserves	**14.306**	**13.730**
	A. Legal reserve	6.707	6.131
	B. Reserves available for distribution	7.599	7.599
V	Accumulated profits	**6**	**4**
Reimbursements from the Flemish Region		**285.406**	**231.919**
VI	Reimbursements from the Flemish Region	285.406	231.919
Provisions for liabilities and charges		**4.423**	**5.463**
VII	Provisions for liabilities and charges	**4.423**	**5.463**
	A.4. Other liabilities and charges	4.423	5.463
Creditors		**1.525.100**	**1.328.348**
VIII	Amounts payable after one year	**794.202**	**717.568**
	A. Financial debts	794.174	717.542
	3. Leasing and other similar obligations	3.895	4.009
	4. Credit institutions	790.279	713.533
	D. Other amounts payable	28	26
IX	Amounts payable within one year	**720.901**	**600.948**
	A. Current portion of amounts payable after one year	77.952	67.182
	B. Financial debts	298.530	207.538
	1. Credit institutions	298.530	207.538
	C. Trade debts	79.928	84.876
	1. Suppliers	79.928	84.876
	D. Advances received on contracts in progress	2.066	1.954
	E. Taxes, remuneration and social security	250.011	228.355
	1. Taxes	245.942	224.508
	2. Remuneration and social security	4.069	3.847
	F. Other amounts payable	12.414	11.043
X	Accruals	**9.997**	**9.832**
TOTAL LIABILITIES		**1.928.667**	**1.678.890**

Profit and loss account

(000 euro)		31 december 2002	31 december 2001
I	**Operating income**	**272,541**	**261,171**
	A. Turnover	77,359	78,831
	B. Increase in stocks of finished goods, work and contracts in progres	233	-125
	D. Other operating income	194,949	182,465
II	**Operating charges**	**-194,941**	**-186,628**
	A. Raw materials, consumables and goods for resale	54,289	57,833
	B. Services and other goods	18,978	18,017
	C. Remuneration, social security costs and pensions	35,659	32,528
	D. Depreciation of tangible fixed assets	83,753	76,569
	E. Increase in amounts written off trade debtors	-14	-291
	F. Provisions for other liabilities and charges	-1,040	-881
	G. Other operating charges	3,316	2,853
III	**Operating profit**	**77,600**	**74,543**
IV	**Financial income**	**334**	**371**
	B. Income from current assets	329	364
	C. Other financial income	5	7
V	**Financial charges**	**-56,362**	**-53,928**
	A. Debt charges	55,990	53,600
	C. Other financial income	372	328
VI	**Profit on ordinary activities before taxes**	**21,572**	**20,986**
VIII	**Extraordinary income**	**-574**	
	B. Amounts written off financial fixed assets	574	
IX	**Profit of the year before taxes**	**20,998**	**20,986**
X	**Income taxes**	**-9,496**	**-9,397**
	A. Income taxes (note XV)	-9,515	-9,397
	B. Adjustment of income taxes and write-back of tax provisions	19	
XIII	**Profit of the year available for appropriation**	**11,502**	**11,589**

Profit distribution (000 euro)

		31 december 2002	31 december 2001
Appropriation account			
A.	**Profit to be appropriated**	**11,506**	**11,606**
	1. Profit for the period available for appropriation	11,502	11,589
	2. Profit brought forward	4	17
C.	**Appropriation to capital and reserves**	**-576**	**-581**
	2. To legal reserve	576	-581
D.	**Result to be carried forward**	**-6**	**-4**
	1. Profit to be carried forward		-4
F.	**Distribution of profit**	**-10,924**	**11,020**
	1. Dividends	10,924	11,020

Statement

III	**Statement of tangible fixed assets** (000 euro)	Land and buildings	Plants, machinery and equipment	Furniture and vehicles
a)	**Acquisition cost**			
	At the end of the preceding year	45,050	1,529,131	9,107
	Movements during the year			
	- Acquisitions, including the produced fixed assets	10,109	926	598
	- Sales and disposals (-)		-2,662	-4,048
	- Transfers from one heading to another		217,473	
	At the end of the year	55,159	1,744,868	5,657
c)	**Depreciation**			
	At the end of the preceding year	10,396	439,258	7,902
	Movements during the year			
	- Recorded	2,015	80,308	836
	- Recorded after sales and disposals		-2,663	-4,048
	At the end of the year	12,411	516,903	4,690
d)	**Net book value at the end of the year (a) - (c)**	**42,748**	**1,227,965**	**967**

		Leasing and other similar rights	Other tangible assets	Assets under construction
a)	**Acquisition cost**			
	At the end of the preceding year	4,374	3,288	291,409
	Movements during the year			
	- Acquisitions, including the produced fixed assets		58	240,842
	- Transfers from one heading to another			-217,483
	At the end of the year	4,374	3,346	314,778
c)	**Depreciation**			
	At the end of the preceding year	1,255	2,510	
	Movements during the year			
	- Recorded	219	375	
	At the end of the year	1,474	2,885	
d)	**Net book value at the end of the year (a) - (c)**	**2,900**	**461**	**314,778**

IV Statement of financial fixed assets (000 euro)

	Affiliated companies	Other companies
1. Participating interests and shares		
Net book value at the end of the preceding year	1,681	
Movements during the year		
- Acquisitions	1,250	
- Depreciations recorded	-574	
Net book value at the end of the year	2,357	
2. Amounts receivable		
Net book value at the end of the preceding year		48
Movements during the year		
- Additions		17
- Reimbursements		-12
Net book value at the end of the year		53

VI Investements: other investments and deposits (000 euro)

	Year	Previous year
Term deposits with credit institutions falling due:		**2,974**
- less or equal to one month		2,974

VII Accruals (000 euro)

	Year
Analysis of heading 490/1 of assets if the amount is significant	
- Costs paid in advance	548
- Interests	989

VIII Statement of the capital (000 euro)

	Amounts	Number of shares
A. Share capital		
1. Issued capital	**198,400**	
- At the end of the preceding year		
- Capital increase		
- At the end of the year	198,400	
2. Structure of the capital		
2.1. Categories of shares		
- Ordinary shares	198,400	800,000
2.2. Nominative shares		800,000
B. Unpaid capital	**98,974**	
Uncalled capital	98,974	
TOTAL		

IX Provisions for other liabilities and charges (000 euro)

	Year
Costs anticipated for late deliveries	1,315
Costs anticipated for legal disputes	2,441
Disputes with regard to the Agreement with the Flemish Region	326
Costs anticipated for sludge disposal	341

X Statement of amounts payable (000 euro)

	not more than 1 year	between 1 and 5 years	Over 5 years
A. Analysis of debts with an original maturity of more than one year, according to their residual maturity			
Financial debts	77,952	307,898	486,276
3. Leasing and other similar obligations	114	667	3,228
4. Credit institutions	77,838	307,231	483,048
Other amounts payable		28	
TOTAL	**77,952**	**307,926**	**486,276**

	Year
C. Amounts payable with respect to remuneration and social security	
1. Taxes	
b. Non expired taxes payable	245,942
2. Remuneration and social security	
b. Other amounts payable relating to remuneration and social security	4,069

XI Accruals (000 euro)

	Year
Accrued interests	9,945
Other accruals	52

XII Operating results

		Year	Previous year
C1.	**Average number of persons employed**		
	a. Total at the closing date	675	704
	b. Average staff, calculated in full-time equivalents	673.3	674.4
	c. Number of hours worked	1,097,007	1,101,788
C2.	**Personnel charges**		
	a. Remuneration and direct social benefits	25,386	23,130
	b. Employer's contributions for social security	7,755	6,931
	c. Employer's premium for extra-statutory insurance	1,083	993
	d. Other personnel charges	1,429	1,473
	e. Pensions	6	1
D.	**Amounts written off**		
	2. Trade debtors		
	Write-downs	208	405
	Write-backs	-222	-696
E.	**Provisions for liabilities and charges**		
	Increases	1,535	1,350
	Decreases	-2,576	-2,231
F.	**Other operating charges**		
	Taxes related to operations	1,891	1,005
	Other charges	1,425	1,848
G.	**Agency staff and other people available to the company during the financial year**		
	1. Total at closing date	2	10
	2. Average number in full-time equivalents	11,6	12,9
	Average number of hours worked	23,120	25,494
	Company costs	514	465

XIII Financial results

		Year	Previous year
E.	**Other financial costs**		
	Bank costs	371	324
	Other financial costs	1	4

XV Income taxes (000 euro)

		Year
A.	**Analysis of the heading 'Income taxes'**	
1.	Income taxes of the current year	8,933
a.	Taxes and withholding taxes due or paid	9,046
b.	Excess of income tax prepayments and withholding taxes capitalised	-133
2.	Income taxes on previous periods	582
a.	Additional charges for income taxes due or paid	108
b.	Additional charges for income taxes estimated or provided for	474

XVI Other taxes and taxes supported by third parties (000 euro)

		Year	Previous year
A.	**Value added tax, turnover taxes and special taxes charged during the year:**		
1.	To the enterprise (deductible)	70,422	63,525
2.	By the enterprise	123,926	66,244
B.	**Amounts retained on behalf of third parties for:**		
1.	Payroll withholding taxes	7,252	6,869
2.	Withholding taxes on investment income		

XVII Rights and commitments not reflected in the balance sheet (000 euro)

	Year
Granted projects not yet activated	259,335
Obligations to purchase land	2,425

XVIII Relationships with affiliated enterprises and enterprises linked by participating interests (000 euro)

		Year	Previous year
1.	Financial fixed assets: investments	2,357	1681
2.	Amounts receivable within one year	195	80

Statement with regard to the consolidated annual account	
B.	Information to be given by the enterprise if it is a subsidiary or a communal subsidiary

A consolidated annual account is drafted and published by:
Vlaamse Milieuholding N.V., Uitbreidingsstraat 62, 2600 Antwerpen – Berchem. V.A.T.-number: BE 440.019.81

Social balance sheet

I Statement of employees

A.	Employees registered in	Full-time	Part-time	Total or total in full-time equivalents	
1.	During the financial year & the preceding financial year	Year	Year	Year	Previous year
	Average number of employees	619.3	72.3	673.3	674.4
	Average number of hours worked	1,011,657	85,350	1,097,007	1,101,788
	Personnel costs (000 euro)	33,059	2,600	35,659	32,528
	Benefits in addition to the salary			297	211
2.	On the date of closing the financial year	Full-time	Part-time	Total or total in full-time equivalents	
	a. Number of employees registered in the staff register	597	78		655.9
	b. According to the nature of the contract	597	78		655.9
	Contract for indefinite duration				
	Contract for definite duration				
	c. According to gender				
	Male	477	18		491.6
	Female	120	60		164.3
	d. According to professional category				
	Management				
	White collar	584	77		642.1
	Other	13	1		13.8

B.	Agency staff and other people available to the company during the financial year	Agency staff
	Average number of people employed	11.6
	Number of hours actually worked	23,120
	Company costs (000 euro)	514

II Table of staff changes during the financial year	Full-time	Part-time	Total in full-time equivalents
A. Incoming			
a. Number of employees registered in the staff register during the financial year	**91**	**1**	**91,8**
b. According to the nature of the contract			
Contract for indefinite duration	34	1	34.8
Contract for definite duration	57		57.0
c. According to gender and qualifications			
Male:			
secondary education	49		49.0
higher non-university education	5		5.0
university education	2		2.0
Female:			
secondary education	32	1	32.8
higher non-university education	2		2.0
university education	1		1.0
B. Outgoing			
a. Number of employees for whom the termination of their contract was recorded in the staff register during the financial year	111	10	117.4
b. According to the nature of the contract			
Contract for indefinite duration	54	**10**	60.4
Contract for definite duration	57		57
c. According to gender and qualifications			
Male:			
secondary education	53	1	53.8
higher non-university education	8		8.0
university education	8		8.0
Female:			
secondary education	33	3	34.6
higher non-university education	7	2	7.8
university education	2	4	5.2
d. According to the reason for terminating the contract			
Pension	1		1.0
Prepension	2		2.0
Dismissal	17	9	22.6
Other reason	91	1	91.8

III Statement on the use of measures to combat unemployment during the financial year

	Number	In full-time equivalents	Financial benefit (000 euro)
1. Measures with a financial benefit for the employer relating to the person or his replacement			
1.6 Structural reduction of social security contributions	718	699.0	802,477
1.11 Initial job agreement	33	33.0	40,531
2. Other measures			
2.4 Reduction of employee's social security contribution regarding low-wage workers	7	6.8	
Number of employees involved in one or more measures to combat unemployment			
- Total for the financial year	718	699	
- Total for the previous financial year	5	4.5	

IV Information on employee training during the financial year

	Number of employees involved	Total training hours	Cost for the company (000 euro)
Total training initiatives to the charge of the employer			
- Male	243	6.496	134
- Female	130	2015	72

V Information on educational or tutorial activities of employees in compliance with the law of September 5th 2001 concerning the improvement of the employee rate

	Number of employees practising	Number of hours spent on these activities	Number of employees attending these activities
Educational or tutorial activities			
- Male	19	960	24
- Female	15	400	10

Additional information

I Summary of the valuation rules

1 Starting-up costs - costs of capital increases

Starting-up costs are booked in P & L at acquisition value in the year in which they are incurred or in which commitments were made.
Costs for capital increases are booked in P & L in the year in which the increase has taken place.

2 Tangible fixed assets

Tangible fixed assets are booked at their acquisition price, i.e. purchase price plus related costs.
Following depreciation percentages are applied:

- **For permanent assets proper to the main office:**

office materials:	linear 20 %
furniture:	linear 14.25 %
vehicles and mobile plant:	linear 25 %
telephone installation:	linear 20 %
computer hard- and software:	linear 33.33 %
installation and furnishing costs of rented buildings:	linear 33.33 %
machines and equipment:	linear 20 %
establishment of laboratory:	linear 20 %
leased office buildings:	linear 5 %
installation and furnishing costs of leased buildings:	linear 33.33 %

- **For permanent assets proper to the projects:**
  These assets are transferred from work in progress to tangible fixed assets when the project is delivered.
  Four classes are distinguished in function of their economic life, for which the following depreciation percentages are applied:

class 1: linear 25 %
class 2: linear 14.25 %
class 3: linear 6.66 %
class 4: linear 3.03 %

The following investments belong to class 1:
Computers, office machines, software, telemetry equipment, portable equipment, radio transmitters, telecommunication equipment, sampling equipment, measuring equipment, lawn mowers, laboratory equipment, private cars, light company vehicles.
This list is non-limitative.

The following investments belong to class 2:
Portable pumps, aerators, mixers and generators of < 25 KW, agricultural machinery, renovation of the buildings, furniture, heavy mobile plant such as vehicles for transporting sludge, lorries, tractors and small bulldozers. This list is non-limitative.

The following investments belong to class 3:
Fences, sampling and measuring instruments, workshop machinery, movable cranes, or pumps and generators > 25 KW, steel storage tanks, immovable electrical and mechanical equipment of new installations.
This list is non-limitative.

The following investments belong to class 4:
Roads, constructions for sewage treatment works and pumping stations, buildings, discharging constructions, sewers, trunk sewers, priority sewers, pressure lines, manholes, roller bridges, plants.
This list is non-limitative.

Related costs – except for land – are taken into P & L in the year of delivery.

- **For permanent assets of the operations department:**
  The following depreciation percentages are applied:
  - for investments with regard to the renovation of buildings at Aquafin's disposal: linear 14.25%
  - for investments with regard to the construction of buildings: linear 3.03%

  Moreover, two classes are distinguished in function of their economic life, for which the following depreciation percentages are applied:

  class 1: linear 25 %
  class 2: linear 14.25 %.

  The non-limitative list with the contents of classes 1 and 2 can be found above.

- **For the renovation of VMM installations:**
  The reparation works for which a Technical Plan is being established are registered as assets. These are the reparation works with an estimated minimum life of more than 7 years, in accordance with the Agreement with the Flemish Region. These assets are transferred from 'works in progress' to 'other tangible fixed assets' when the project is delivered. The division into classes and the relating depreciation rates correspond to the rates for permanent assets proper to the projects.

No depreciation is applied to tangible fixed assets under construction.
Additional or exceptional depreciation is allowed for material fixed assets when their utility for the company is below the book value due to economical or technological conditions.
Fixed assets which are no longer used or no longer permanently contribute to the activity are depreciated so that the book value corresponds to the estimated disposal value.
Invoices of assets with a value of less than 2478.93 EUR are immediately taken into P & L, except for:

- assets that are acquired under an approved Technical Plan,
- advance invoices,
- invoices relating to parts or expansions of assets.

3 Financial fixed assets

Participations, shares and fixed income securities titles are booked at purchase price. Related costs are immediately taken into P & L.
In case of permanent depreciation or devaluation, the reduction in value of participations and shares may be written off when this is warranted by the status, the probability or the prospects of the company concerned.

4 Long-term receivables

Receivables are booked at face value except for fixed rate instruments which are booked at the lowest of the following values: purchase price or repayment price. Related costs are immediately booked against P & L.
A depreciation is applied when repayment at the expiry date becomes uncertain.

5 Receivables within one year

Receivables are shown in the account at their face value. Fixed rate instruments are booked at the lowest of the following values: purchase price or repayment price. Additional costs are immediately booked at the charge of the result.
Depreciations are applied when for the whole or a part of the receivable payment on the expiry date is uncertain.

6 Deposits

Deposits at financial institutions are booked at face value. Paper instruments are booked at the lowest of either purchase price or repayment price. Related costs are immediately booked at the charge of the result.
At the closing of the financial year depreciation is booked when the market value is lower than the booked value.

7 Cash

Is booked at face value. At the closing of the financial year depreciation is booked when the market value is lower than the booked value.

8 Debts

Are booked at face value.

9 Foreign currency

Debts and receivables in foreign currency are converted at the exchange rate of the last day of the financial year when closing the financial year.

10 Accruals

Are booked at acquisition value and posted to the balance sheet for the part which refers to the following financial year(s).

11 Orders in progress - Valuation of projects beyond the execution of the Agreement with the Flemish Region

Costs incurred in the framework of projects beyond the Agreement with the Flemish Region are booked as orders in progress.
Orders in progress are booked at manufacturing price.
The positive difference between the selling price and the manufacturing price (profit) is only taken into P & L once the order has been fully executed.
Upon the closing of the financial year orders in progress are depreciated if their manufacturing price plus the estimated amount of the costs still to be made are higher than the net purchasing price or the price stipulated in the contract.

II Transfer of assets upon the expiry of the Agreement with the Flemish Region

Aquafin N.V. shall keep the full ownership of the installations which will be established on terrains forming part of the public domain, because the Flemish Region relinquishes its right of accession for the full period of the Agreement. From the moment when the Agreement expires, the title to ownership of these installations and other constructions shall be transferred to the Flemish Region, for which transfer the Flemish Region shall not be due any payment whatsoever.
If Aquafin NV erects all kinds of installations or other buildings on its own terrains which are indispensable for the execution of a Technical Plan, such installations and/or buildings shall be transferred to the Flemish Region after the expiry of the Agreement, for which transfer the Flemish Region shall not be due any payment whatsoever.

III Disputes

1. Aquafin NV is involved in a number of disputes of which the result is not predictable. For the moment it is not possible to determine the responsibility for these disputes. Nor is the amount of the damage in the present status possible to estimate.

2. As from 1 January 1994 Aquafin has taken the place of VMM in a number of disputes. In the Agreement between the Flemish Region and Aquafin, the Flemish Region is prepared to pay the costs concerning Aquafin's utility right for the VMM installations.
For all these disputes Aquafin expects a refund by the government for the costs and charges made, provided that they are not in consequence of faults or negligence caused by Aquafin NV.

3. Aquafin is involved in an important dispute as a result of the rainfall of September 1998. The Board of Directors of Aquafin believes to have been confronted with an Act of God (cf. the indemnification of the disaster relief fund on the occasion of the rainfall of September 1998) and believes that Aquafin didn't commit an error. The court hasn't decided yet on any liabilities in this case.
Though there is no certainty at the moment, the Board of Directors believes this dispute will not cause any damages which will not be reimbursed as acceptable costs by the Flemish Region or will not be refunded by the insurance company.

4. The VAT affair
As already mentioned in last year's annual report, there is a dispute between Aquafin and the Belgian VAT authorities regarding the rate of VAT applicable to the company's activities. Aquafin feels that is entitled to the reduced rate and has therefore lodged an objection against the decision of the VAT authorities to apply the increased rate of 21%.
This legal action, which is being pursued in consultation with the Flemish Region, is pending.

The action will not have any negative impact on Aquafin, as the management agreement concluded with the Flemish Region provides for taxes being treated as 'reasonable expenditure'. The money will therefore be reimbursed by the Flemish Region. This standpoint was confirmed by the decision of the Flemish Government of 26 April 2002 in which it agreed to sign an agreement with Aquafin explicitly stating that – as long as the matter is handled responsibly and with due care – all the potential financial impact of the dispute will be passed on to the Flemish Region.

5. Provisions for legal disputes

Regarding the provisions for legal disputes, EUR 315,788 in provisions has been withdrawn following an additional check and after making contact with the lawyers handling the cases concerned. A further EUR 292,174 in provisions has been withdrawn following an evaluation of the company's experience of settling compensation claims over the past ten years. Both adjustments were made with the approval of the Statutory Auditor.

6. Notice of default from the EU

In the autumn of 2002, Aquafin received via VMH a copy of the notice of default from the EU relating to VMH and some of its subsidiaries. As regards Aquafin, the 1994 arbitration agreement was called into question in the light of new case law from the Court of Justice.

The analysis performed by the law firm appointed by the Flemish Region, Stibbe, showed that the recent judgment merely broadens the interpretation that was used for the 1994 arbitration agreement. In addition, Aquafin was assigned its task via an act under administrative law - more specifically, under the Administrative Policy Decree of 12 December 1990 - so that there is no problem with the way the task was assigned. Aquafin can accordingly put together a solid defence.

In mid-March 2003, however, the Flemish Region decided - due to the pending renegotiations - not to forward these arguments to the European Commission. The Board has lodged a formal protest against this course of action. The Board is trying to ensure that the defence in question is still sent to the Commission, either by Aquafin or by the Flemish Region.

IV Allocation agreement

Aquafin NV has signed an allocation agreement during the 1994 financial year. The agreement between Aquafin NV, the Flemish Region, the European Investment Bank and the Gemeentekrediet stipulates that, in case Aquafin NV fails to fulfil its obligations to its long-term financiers, the claims on the Flemish Region for the investments and the interests on loans will not be paid to Aquafin by the Flemish Region any longer.

These claims will be paid by the Flemish Region as the solvens from Aquafin to the Gemeentekrediet, which acts as the agent of the long-term grantors of Aquafin NV. Long-term credits with an original term longer than or equal to 5 year come under this agreement.

More space for environment-conscious angler

The major efforts being made to improve the quality of our Flemish watercourses are delivering clear results. This can be seen from, among other evidence, the striking increase in the fish population of our major rivers. What is more, species of fish are once again appearing that biologists considered, until a short while ago, to be as good as extinct. These rivers include the Dender and the stretch of the Leie in the tourist country between Ghent and Deinze. Recently, rare and protected species have once again been caught and, following examination, released back into the wild at various locations.

On the Upper Schelde, the presence of protected species such as the brown trout, the river lamprey and the dace has been demonstrated. A river lamprey was also caught for the first time in January 2001 on the Ghent ring canal. In 2002 more than 200 of these rare fish have already been observed. Then again, on the IJzer and the Demer a spined loach (Cobitis taenia), a species protected by the European Habitats Directive, was caught. And on the stretch of the Schelde bordering the Annabos, salmon trout and even a sea lamprey have been caught. It is more than 100 years since the second of these two species was last seen in the Schelde.

After more than a century of heavy decreases in population, the tide at last seems to be turning for our river fishes. But the situation is certainly not yet ideal. Major efforts must still be made to make our rivers healthy once more.

Flemish Minister of the Environment & Agriculture, Madame Vera Dua
in 'Meer ruimte voor natuurbewuste hengelaar', press release 12 March 2003.

Notes

Aquafin NV

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