Swiss Expertise –

for natural water treatment worldwide

WORLD FUTURE ENERGY SUMMIT
Abu Dhabi, 17-20 January 2011

cleantech switzerland
Innovative. Reliable. Precise.

WRA GROUP · SWITZERLAND
NATURAL WATER PURIFICATION SYSTEMS

Natural Water Purification Systems – individual, economical, sustainable

With its system solutions for natural sewage treatment, WRA Group Switzerland is delivering responses to a global challenge: water is one of our most precious resources, because of its scarcity and because of its huge importance in all areas of life. Even in places where water seems abundant, it's crucial to set a course for sustainable usage – and the earlier the better.

Tailor-made system solutions – a proven concept
Over the last 15 years, the WRA Group has made significant advances in the natural treatment of waste water. It has built more than 350 systems around the world, including 90 in Switzerland. Its purification systems are based on a natural cleansing process and solid scientific know-how. Each WRA system (WurzelRaumAnlage – German for "root zone treatment system") is optimized to meet the specific requirements of the project concerned. The firm offers customized solutions for sewage purification, rain water treatment and sludge humification.

From pioneer to best in class
Thanks to its genuinely pioneering work, WRA Group has set new standards with regard to the water quality, energy efficiency and sustainability of purification systems. Its WRA system can purify domestic waste water, special or industrial sewage to a level at least comparable with all other available systems.

Responsibility and forward-thinking pay off
In a time when investment decisions often hinge on environmental and sustainability concerns, WRA system solutions look even more attractive. Extremely cost-effective operation, economical energy profile, environmentally friendly CO_2 impact, a life of 50 years or more, and the same level of purification: natural water treatment systems are a very attractive option.

Systematic progress – in five steps

Whatever our clients need or want, our system solutions provide the right response – and professional support in five steps.

1. Feasibility study	2. Contract definition	3. Planning process	4. Implementation work	5. Operation
• **Analysis** of local requirements • **Investigation** of topographic characteristics and make-up of the existing growing medium • **Targeted data gathering** to assess feasibility	• **Defining** the scope of the project and drawing up the contract • **Defining** the site, investment costs and operating costs • **Issuing guarantees** for the work we do	• **Developing** a tailor-made system solution • **Working** with local partners on construction plans • **Ongoing quality control** and optimization	• **Construction** of natural water purification system by local partners in line with local regulations • **Supervision** of construction process to ensure optimum quality control • **Onsite monitoring** of implementation through predefined interfaces	• **Support** for customer for first three years of the system's operation • **System set-up optimized** on-site during run-in period • **Regular control** through remote digital data monitoring

Naturally pure, naturally better – how WRA root zone treatment systems work

Extremely efficient

The quality of the purified water is at least as good as that produced by a conventional treatment plant, and this is guaranteed any time, summer or winter, and any place, from high alpine conditions to desert regions. System life expectancy is up to 50 years or more.

Concentrated power

The adapted growing medium is a complex ecosystem. 1 g of normal soil contains between 100 million and 1 billion soil bacteria, but close to the roots of water plants this concentration rises to between 10 and 100 billion. It is this density of aerobic, anaerobic and microaerophilic bacteria that enables the biological breakdown of harmful substances. This is the vital purifying element within the WRA principle.

Reliable quality

Aquatic plants, such as reeds, transport oxygen to their roots and immediate surrounds through their loose-knit stem tissue. This accelerates the growth of bacteria. This in turn activates the growing medium, which is the plants' key role within the WRA principle. The root structure becomes denser over time, so the purification system can deliver reliable quality for many years.

Tailored execution

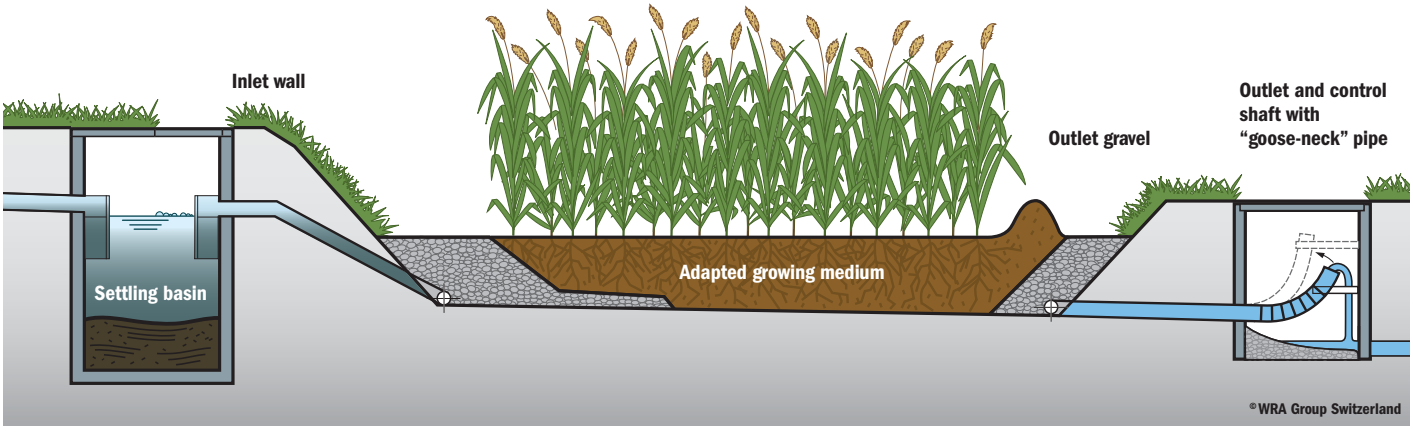
System solutions are individually designed to take full account of local conditions, including topographic features, weather conditions and varying volumes of waste water.

Controllable reduction of nutrients

Depending on requirements, more or fewer nutrients (phosphates, nitrates) can be taken out of the waste water during the purification process before it is returned to the natural water cycle.

Climate-friendly waste disposal

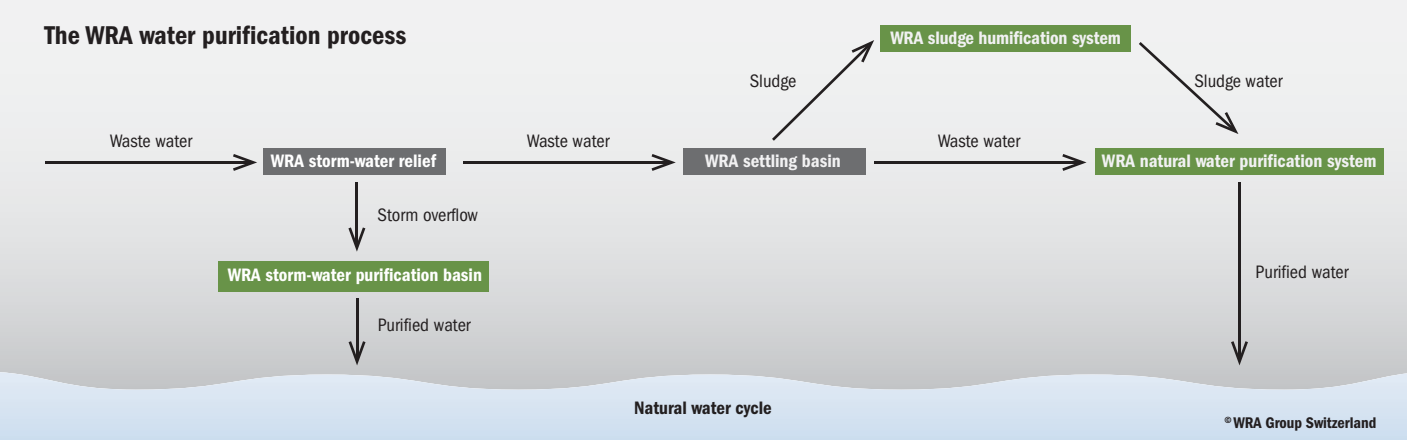
The process only produces a small volume of sludge. The relatively expensive, CO_2-intensive disposal of this waste can be massively reduced by the sludge humification system developed by the WRA Group.



The treatment of waste water in root zone systems stands on the threshold of a breakthrough: In the root zone treatment process, raw sewage is pre-cleaned in a settling basin where suspended solids and sediment are deposited. The solids-free waste water is then taken via a distribution channel to the inlet wall and through into the root zone purification bed. This has an impermeable liner at the bottom, so the waste water flows through the growing medium. The closed system is linked to a control shaft that regulates the amount of time waste water spends in the bed by means of a height-adjustable goose-neck pipe. The higher the concentration of pollutants, the more time bacteria needs to break down the harmful substances, so the longer the waste water is left in the system.

Other applications of the WRA system

All our system solutions – waste water treatment systems, planted storm-water basins, sludge humification systems – are highly flexible. They can be implemented as standalones or in combination to suit local requirements and conditions.



Storm-water relief

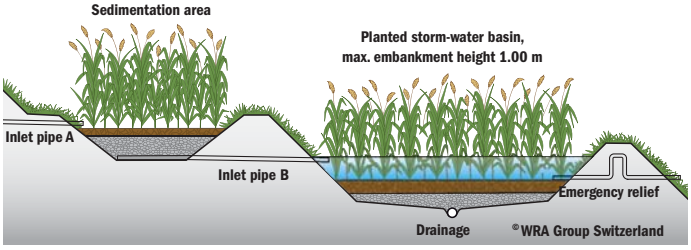
When the weather is dry, all of the waste water flows through the storm-water relief system towards the purification system. In wet weather, the waste water is separated and additional volumes of diluted waste water flow into the planted storm-water basin.

Settling basin

There is usually a grill in front of the settling basin to catch pieces of cloth and plastic. Sludge falls to the bottom of the settling basin so the waste water can flow into the natural water purification system free from solid material.

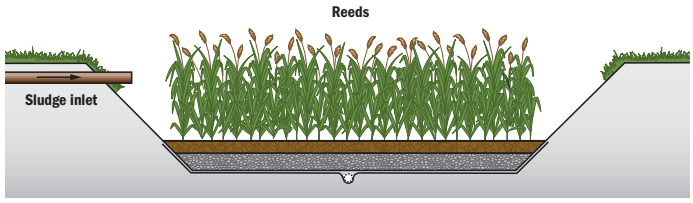
Planted storm-water basins

Rain will put any purification system under strain, which can compromise process stability. Planted storm-water basins help by diverting the rain water and purifying it separately. Solids washed in by the rain are removed from the diluted waste water in the sedimentation zone and then purified as much as possible in the planted storm-water basin using the root zone principle. This natural solution offers large capacity, low operating costs and an unlimited lifetime. Planning and realization of the system is tailored to the specific requirements and can be further developed and extended at any time.

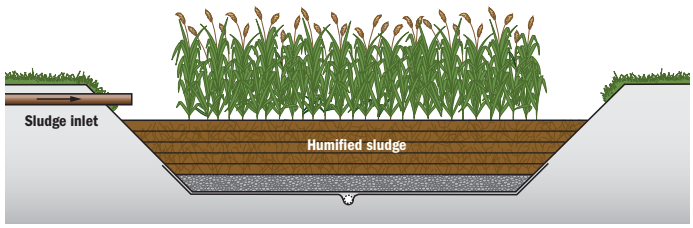


Sludge humification systems

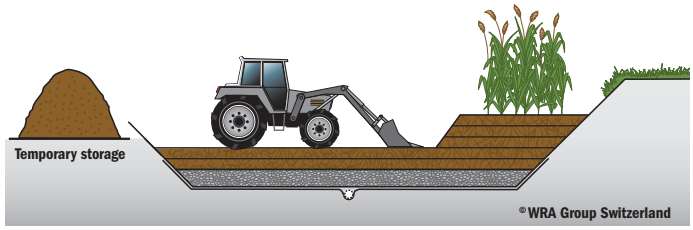
As a further link in the chain of waste water purification, sludge humification offers compelling advantages over the expensive alternative of drying and burning. A reed's ability to extract water is not primarily due to evaporation from the plant itself, but to the disruption of colloids by its root structure and rhizome. After the system has been fed with sludge for 30–50 years, the plant basin will be full of humus. Once this is removed, the basin can be used again for humification.



Sludge humification system, first year of operation



Subsequent years: dewatering and humification of sludge



Reedbed cleared after 30–50 years: humified sludge removed and system begins operating again

WRA Group Switzerland creates effective, environmentally friendly, natural water purification systems that deliver huge advantages over other systems.

90% energy saving

66 tonnes less CO_2 emitted

per year by a system servicing 2000 people

90% saving on operational costs

Equal water quality

Unlike conventional technical systems, the WRA purification system is based on very natural processes. It purifies water without the need for expensive technologies, it requires virtually no maintenance, consumes little energy and is friendly to the environment. The WRA Group's natural water purification systems have proved themselves over many years, with 350 systems built throughout the world to provide a green alternative to conventional waste water treatment.

For communities, industry and zoos

Selected projects (more available on request)

Schwarzenberg (constructed 2006)

- Natural water purification system for 3000 inhabitants, replacing a 25 year-old technical system
- Construction costs same as a technical system
- Operating costs: 10 % of equivalent technical system

Suraua (constructed 2004)

- Communal system for three settlements, 1500 inhabitants in total
- Natural water purification system and sludge humification, set up for 60 to 80 years
- CO_2: 49.5 tonnes less emitted per year than a comparable technical system

Wiler (constructed 2003)

- Natural water purification system with storm-water relief and sludge humification at 1420 meters above sea level
- Holiday village: waste water from 1000 inhabitants in summer, 5000 in winter
- Energy consumption: 5 % of equivalent technical system



In the company's headquarters in the Swiss town of Raron, WRA Group Switzerland's Research and Development Centre produces solutions for sites around the world.

WRA Group Switzerland

WRA Group Switzerland has been shaped largely by its founder and managing director Peter Tscherrig. Since the company's establishment in 1998, Peter Tscherrig, an engineer by training, has used his extensive expertise and many years of experience in consulting, planning and property development to help private individuals, communities and companies implement natural water purification systems.

Today, WRA Group Switzerland, based in Raron, Canton Valais, works with partners and licensees around the world. Its network of specialists, which includes planning partners and companies, meets the highest quality standards – the foundation of a genuine success story, with more than 350 systems already implemented around the world.

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Natural water purification systems
Planted storm-water basins
Sludge humification

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