OVIVO™
Bringing water to life℠

Packaged Wastewater Treatment

creating value in water through innovation, creativity and expertise

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A New Global Force in Water

As society and the global economy demand more and more from water, there is a growing requirement for ever more specialist applications to manage clean water, to create specialist process waters, to treat wastewater, to extract energy from wastewater and to champion the reuse of water.

The 2010 merger of Eimco Water Technologies, Enviroquip, Aqua Engineering and Christ Water Technology plus many smaller specialist firms allows Ovivo to offer a unique combination of advanced solutions, probably the most significant application knowledge base in the world and some of the best brains in the business.

Ovivo aims to become the water partner of choice for clients in the public and private sectors and the leading source of water expertise for engineers and consultants across the globe.

For further information, visit
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> *Ovivo - creating value in water through innovation, creativity and expertise in clean water, process water, wastewater treatment, waste-to-energy and water reuse markets across 5 continents.*

Ovivo - bringing water to life

Our Role in your Industry

Nothing lasts forever. Europe and North America face the first era of significant water infrastructure renewal since Victorian engineers first began laying sanitation systems to address the urgent public health crises that their societies faced. Their world contained a third of the number of people that the modern world does. Furthermore, a hundred years ago, a fraction of the world's population lived in cities where water treatment activity was concentrated.

Renewal of water management infrastructure in the first world is extremely expensive and unfortunately the pioneering water management systems of the nineteenth century just do not fit the character of much of the modern world. Civic developments today demand sustainability. As the necessity of wastewater treatment is broadly understood across the globe, non-connected and decentralized wastewater treatment facilities are often economically advisable. Inadequate treatment affects populations and economies as the impact of pollution inhibits development and growth.

Ovivo's range of packaged wastewater units enable the establishment of amenities for a wide variety of residential and commercial uses where operation is remote from public water networks and cannot be reliant on attachment to them.

Why decentralize wastewater treatment?

- Save costs by eliminating sewer costs
- More cost-effective
- Shorter planning horizon
- Reduced environmental impact
- Greener approach to treatment
- Sustainable development

Ovivo also supplies pre-engineered units that provide complete wastewater treatment services to larger facilities such as truck stops, malls, hotels, holiday villages and other facilities whose commercial proposition depends on their remoteness.

Deploying Ovivo's packaged wastewater treatment plant assures that the best available technology is placed at the disposal of your site. Compact Ovivo systems offer reduced footprints and also manage water to maximize the eco-friendliness of wastewater treatment processes. The ease with which they may be operated and maintained and the robust, reliable treatment they provide are backed by comprehensive system and process warranties.

Creating Value

Ovivo's MPAC® system is ideally suited to a wide range of applications including housing developments, parks, transport rest areas, isolated communities, shopping malls, golf courses, resorts, casinos and sewer and water districts.

Sectors we supply

Domestic Dwellings
Population pressures create urgent requirements for housing stock. Where issues of time and cost are paramount, a packaged wastewater system is often recommended to property developers.

Industrial
Natural resources are often located at great distances from population centers. Industrial sites, such as mining camps, require sanitation facilities for employees as well as wastewater treatment plants to minimize the environmental impact of their operations.

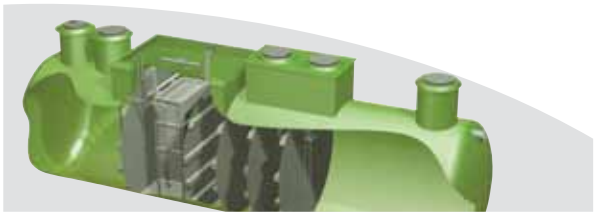
Schools, hospitals and residential care homes
Remote communities and established urban centers located at a distance from water mains infrastructures still require public facilities. These in turn must comply with statutory public health regulations. Ovivo's packaged wastewater plants remove any barriers to providing compliant, effective, environmentally sound public services to such communities.

Hotels, Pubs and Clubs
The appeal and attractiveness of many leisure facilities is a consequence of their remoteness and inaccessibility. Hotels that serve areas of natural beauty are often established at great distances from any sanitation facilities and reliant on their own sources of energy generation. Similarly truck stops and motels are isolated by their nature. Ovivo's innovative, cost-effective packaged wastewater treatment solutions can be relied upon to deliver safe, reliable and long-term service to leisure facilities.

Amenity Sites
Campsites and similar facilities serve relatively large temporary populations, creating a significant water demand that requires careful management.

Systems for Non-connected and Decentralized Supply

Ovivo supplies a range of systems that do not require connection to a public water network. Each of Ovivo's packaged wastewater technologies provides safe, reliable and efficient wastewater treatment that meets the strictest quality standards.



Packaged Membrane Bioreactors (MBRs)

Ovivo's packaged MBRs offer exceptional performance, delivering unrivalled and reliable treatment results to population areas. A below-ground packaged sanitation plant, Ovivo's MBR Technology® system employs simple flat sheet membrane panels housed in stainless steel units whose number can be varied according to hydraulic flow. Aeration generates an upward cross-flow over submerged membranes, which keeps fouling of the filtration surface to a minimum. The membrane panels are manufactured with a pore size in the range of 0.1 to 0.4 microns. In operation, a dynamic layer of protein and cellular material covers membranes. This provides an effective pore size of less than 0.01 microns, which is in the ultrafiltration range.

The process requires no primary or secondary settlement stages and no additional tertiary treatment or UV stages to achieve very high disinfection quality. Treated effluent is removed from the membrane units using gravity head or a pumped suction operation.

The discharged effluent produced is of a quality that allows it to be reused in a variety of applications. It complies with the World Health Organization (WHO) qualification criteria for unlimited irrigation, which is of real benefit to developers concerned with maximizing sustainability. Disinfection of bacteria and viruses occurs at a standard that exceeds EU regulations for bathing or recreational water. In a leisure context, water treated by Ovivo MBRs can be recycled for use in woodlands, gardens or golf courses.

The action of controlled cross-flow velocities over the membrane surfaces minimizes the cleaning required. Ovivo MBRs are designed to run without supervision and by using high quality plastics and stainless steel, the membrane panels and units have long life expectancies, for the most part, beyond 10 years.

Rotating Biological Contactors (RBCs)

RBCs remove soluble, biodegradable, organic materials from wastewater. Ovivo supplies three types of plant, which may be purpose-designed to suit each site's parameters. Ovivo's flexible RBC designs make them equally reliable for long-term use in domestic sanitation settings or for the treatment of industrial effluent. The extremely low power consumption of the Copa® Rotating Biological Contactor makes this a very cost-effective wastewater treatment solution. An integral Copa RBC is designed with a two-stage, horizontal flow primary tank for settling out gross solids from sewage discharges. The large volume of this zone ensures that the settled solids are retained for a long period, reducing costs by reducing the number of tanker visits required. Copa RBC units offer a twenty-year design life.

Package Plants

Ovivo's package Copa RBC plants combine three separate unit processes - primary settlement, biocontact and final clarification - into one tank, and are generally provided for small and medium population ranges. Where the population is too large for a single package RBC, multiples of the unit can be used. The complete treatment process includes a primary settlement tank, a biological contactor and final settlement zone in a single glass reinforced plastic (GRP) shell. GRP covers enclose the whole process. Screened detritus can be collected in the primary tank for removal, avoiding the need for separate onsite disposal facilities for such grit. A system such as a Copa RBC package plant is designed to treat the waste from up to 600 people.

Semi-packaged Plants

As packaged plants increase in size, the single-tank format imposes design and handling constraints. This can be overcome by the provision of a separate final settlement stage housed in a purpose-designed glass reinforced plastic (GRP) conical tank. The septic tank and biozone are still combined in a single unit, and totally enclosed by low profile covers, identical to those used on composite single-tank plants.

Modular RBCs

Ovivo's modular RBC systems separate the primary and final stages from the biozone for use amongst larger populations. The primary treatment can be conducted either in a sealed septic tank to retain the desludging advantages of the smaller system, or a conical upward flow settlement tank. Biological treatment takes place in a self-contained bio contactor. The final settlement stage is undertaken in an upward flow clarifier. Ovivo's conical tanks have an external effluent launder provided with conventional weirs or multiple-dip pipe outlets. Deploying individual tanks for each of the three unit processes often provides the greatest flexibility in process design and site layout and enables the integration of existing facilities.

Submerged Aerated Filters (SAFs)

Ovivo SAFs are high performance biological filters for the treatment of both industrial effluent and domestic waste from populations that range between one hundred and three thousand people. The SAF is a fabricated steel tank split into treatment cells that are arranged in series. Each cell houses a number of fine bubble membrane diffusers, which are mounted below packed rigid corrugated PVC media.

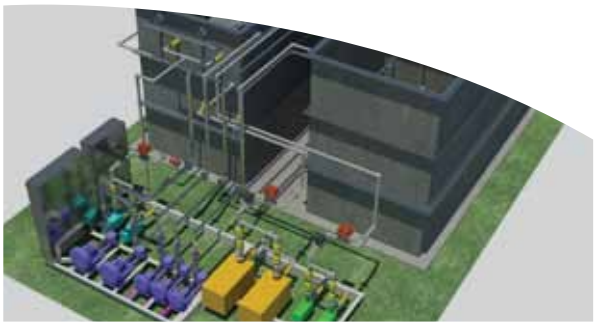
The diffusers provide air to keep the treatment system healthy and to air-scour the media. The consequent release of dead biomass removes the need for backwashing. The diffusers can be accessed for maintenance without removing the media in both above- and below-ground installations.

Creating Value

Service plans are tailored to meet the individual needs of each client and include online, real-time technical support, remote monitoring and optimization, access to a local network of certified technicians and reduced field service rates.

Flow enters the first SAF cell at high level, passes through the media of each cell in turn, and exits the final cell also at high level. This arrangement ensures that the SAF media is constantly submerged and the SAF remains active during periods of low or no flow.

Ovivo's SAF units reduce biochemical oxygen demand (BOD) immediately and are likely to be 100% effective within four weeks of start-up. With only one moving part, Copa Submerged Aerated Filters provide a low-maintenance, easily operable wastewater treatment solution. This robust process can be used for treating both domestic and industrial effluents. The technology can achieve stringent final effluent standards with only a small footprint. Manufactured in stainless or mild steel the Copa SAF unit offers an operation life of up to twenty-five years.



Containerized Plants

Ovivo's Enviroquip® MPAC® system is a pre-engineered MBR system. MPAC system offers a complete solution to your wastewater treatment needs, combining several operations into one fully functional wastewater treatment plant.

Likewise Ovivo offers containerized SBR type wastewater treatment plants, which can be upscaled to needed capacity in 50 m^3/day module capacity up to 300 m^3/day in a single plant. All modules are of 20 feet container size and have been successfully used for hospital wastewater treatment and small scale municipal plant in the past. Sludge handling and effluent polishing as well as disinfection are optionally available.

Containerized plants can be used as a temporary or permanent solution, or as a pilot plant for high strength industrial applications. Containerized pilot plants can treat low strength municipal waste for populations of up to 240, or high strength industrial effluent. The plant has a small footprint and is very easy to set up, plug into power and start treatment. The effluent produced will be of a very high quality.

Case Study **Packaged Wastewater Treatment,** Woodbridge, Ontario, Canada

Brief
Assist Earth Rangers children's charity headquarters work towards net zero energy by replacing their existing MBR (a competitor's Hollow Fiber model, revealed by Earth Ranger's energy audit to constitute a large portion of their energy consumption), with a new wastewater treatment facility.

Solution
We installed a state-of-the-art Flat Plate MBR in place of the previous Hollow Fiber MBR. The use of flat plates reduced the MBR's air requirements, and in turn, the amount of electricity used by the system.

Outcome
The conversion of the plant from Hollow Fiber to Flat Plate took approximately 3 weeks from beginning to end. The system provided by Ovivo reduced the energy cost by 44% over the previous system. The MBR has a capacity of 9850 liters per day.

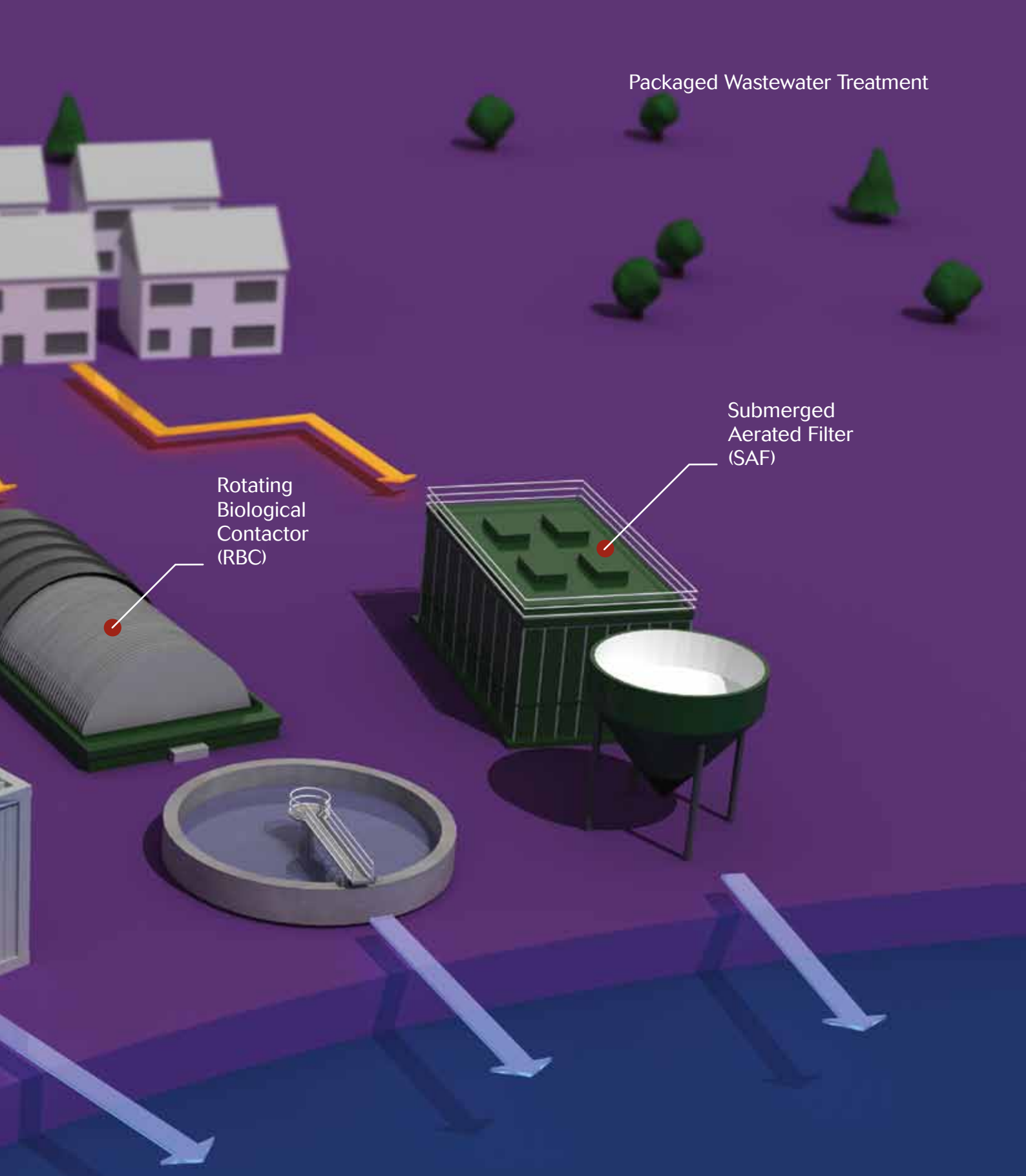
Earth Rangers have been extremely satisfied with the plant's operation. The Flat Plate system presents fewer operations problems and is much easier to maintain than the previous system. Our unit also produces a higher quality effluent that can be reused within the facility.

How we created value

- Contributes towards net zero energy at Earth Rangers Headquarters
- Reduced energy consumption by 44%
- Exceeds performance of competing systems
- Produces high quality effluent for reuse

Our Packaged Wastewater processes

Discover the ways we can help you with your wastewater challenges and help save you money



Case Study **Membrane Bioreactor,** Fort Flagler State Park, Washington State Parks and Recreation Commission

Brief
Washington State Parks and Recreation Commission (Washington Parks) wished to address the environmental health of Puget Sound and Hood Canal, which were experiencing low dissolved oxygen levels, shellfish bed closures and increased storm water run-off from paved services. The Puget Sound Initiative was devised to protect and restore these areas. A major component was the reduction of pollution from failing septic drain fields and wastewater treatment systems (Fort Flagler, Larrabee, Fay Bainbridge, Illahee and Kitsap Memorial State Parks all used septic systems and drain fields / lagoons). Wastewater includes RV (Recreational Vehicle) waste, resulting in higher than normal influent loadings, especially nitrogen.

Solution
Washington Parks invited bids for a single supplier to deliver an MBR system to each of the five parks and potentially others in the future. The Enviroquip® MBR system was selected for lowest capital cost, lowest operation and maintenance costs and low cost of ownership.

Outcome
The Fort Flagler plant has been in operation since 2009. The MBR system effectively treats even the high flows experienced over holiday weekends, performing well during the Fourth of July weekend and during the park's peak season while also operating well during the off season. Average annual flows are 0.025 MGD; peak capacity is 0.05 MGD.

How we create value

- Best value Membrane Bioreactor (MBR) protects environment of Puget Sound and Hood Canal in Washington
- MBR handles high influent loading (RV wastewater) and large seasonal flow variations

Prolonging the efficient life of your assets

Ovivo takes a business-orientated view of total operating costs in water and wastewater. Each office can draw upon global best practice and in-depth application knowledge to ensure the efficient and effective running of water solutions within clients' businesses.

Ovivo's commitment to clients is total, with experts dedicated to the provision of high quality operational support, maintenance, refurbishment and specialty chemical supply.

Ovivo teams worldwide can test and confirm the operating capabilities of systems via regular inspections, either onsite or remotely. They will calibrate water treatment equipment periodically, as specific client service contracts require it.

Your local Ovivo team operates a quality system that conforms to ISO 9001 ensuring that:

- Communicating is as easy as possible
- Local resources are used wherever possible
- Costs are kept to a minimum

Backed by a comprehensive telephone support service and spare part supply agreements, Ovivo's commitment is to develop productive, long-term customer service relationships with every client. Its teams ensure that plants are kept in optimum condition, minimizing downtime for your business and enabling you to operate at optimal efficiency.

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