

The Municipal Case Study

The District of Barriere BC Goes Green with Solar Aquatics and the Vortex Force™

PEX has developed a new approach to controlling odor and corrosion in wastewater systems – Hydraulic Odor Control™. IPEX's latest innovation in this sector is the Vortex Force aerator, a truly unique device that harnesses our proven Vortex technology to oxidize hydrogen sulfide (H₂S) and other odorous and corrosive compounds in wastewater.



Doug Borrill, Senior Utilities Specialist with the District of Barriere, British Columbia, saw the potential for the Vortex Force to solve a difficult problem at a sewage intake tank. During low flow periods the detention time in the tank would grow, and the sewage would become anaerobic, generating H₂S and other odorous gasses. While chemical injection was initially considered, Doug had read about Vortex technology in a technical publication and decided to try something new.

A small Vortex Force was installed in a recirculation loop. Sewage was pulled from the tank, directed through the device and returned to the tank. The results were spectacular. Odor quickly decreased to virtually undetectable levels, and later testing revealed that the Vortex Force device was able to increase dissolved oxygen from virtually zero



to over 5 mg/L in less than one hour. Under these aerobic conditions virtually all the existing H₂S is destroyed and the high levels of dissolved oxygen prevent its re-formation.

“As the largest operating expense for most treatment plants is power, the Vortex Force provided an immediate savings for the District.”

Doug Borrill
Senior Utilities Specialist, District of Barriere

Based on the excellent results achieved during the initial installation, Doug decided to use additional Vortex Force units during the design and construction of an innovative new sewage treatment plant for the District. The new plant uses a new solar aquatics based system to treat the Town's sewage, and the first step in the process is to elevate the dissolved oxygen content of the influent to prepare it for the advanced solar aquatics system.

The initial design called for the system to use fine bubble aeration, but Doug believed that Vortex Force might be a more efficient option. The Town's sewage is pumped from a lift station located at the southeast boundary to the new plant located

near the business district in the centre of Town. The influent is pumped to a large tank where it is run through a Vortex Force unit, which brings the DO content up to about 4 mg/L. The tank feeds two separate streams in the aquaculture process, and the first step in each stream is a Vortex Force Aerator. This second Vortex Force steps the DO from 4 mg/L coming from the tank, up to 8 mg/L, which is virtually the full saturation point. The sewage is run through three successive tanks, which are each cultured with a specific mix of plants. There is an additional Vortex Force on the third tank to again boost the DO content of the flow. By the end of the process, the effluent has been treated to surface water quality levels.

According to Doug, one of the biggest benefits of using the Vortex Force vs. a traditional fine bubble aeration system is the reduction in energy requirements. A fine bubble aeration system would have required a 15 horsepower compressor, while the Vortex Force units can run on a small 2 horsepower pump. "As the largest operating expense for most treatment plants is power, the Vortex Force provided an immediate savings for the District" said Doug.

Along with energy savings, Colleen Hannigan, the District's Chief Administrative Officer mentioned another important benefit: "The new treatment plant is located in a populated area, and a compressor generates a significant amount of noise. The Vortex Force units are very quiet, eliminating a potential concern for area residences and businesses."

Dissolved oxygen destroys H₂S and creates an aerobic environment where sulphate reducing bacteria cannot survive, thus eliminating the root cause of H₂S generation in sewage. In addition, maintaining high levels of dissolved oxygen in a sewage system has the potential to reduce treatment costs, as the first step in most treatment processes is to aerate the influent. The Vortex Force has proven to be an energy efficient, low maintenance alternative for the District of Barriere.

To find out more, visit Vortex Force page at <http://www.ipexna.com/products/municipal/specialty-products/vortex-force-aerator-for-sewer-odor-and-corrosion-control/>

PRODUCT DETAILS SIZES

Small 126-396 GPM	Medium 396-1110 GPM	Large 1110-2616 GPM
--------------------------	----------------------------	----------------------------

HOW IT WORKS

Vortex Top Form

The incoming flow is split into two streams, each being directed into a vortex channel. The upper vortex directs the flow in a clockwise direction while the lower vortex is counter-clockwise.

Vortex Drop Shaft

The two flows intersect at the drop pipe, creating an area of intense turbulence and mixing where air is drawn in to the device. The turbulence breaks up the air into extremely small bubbles, thus maximizing the surface area of the air in contact with the water, allowing oxygen to quickly diffuse into the flow.

Energy Dissipation Pool

The flow is then discharged to the energy dissipation pool where any air not dissolved into the flow is allowed to bubble out of the flow, and the energy of the discharge is dissipated.

TYPICAL PROJECT FLOW FOR A VORTEX FLOW INSERT

STEP 1: Flow Rate

Determine the peak flow rate of your system.

STEP 2: Drop Height

Determine the drop height. To operate effectively, a Vortex Force requires a minimum 3ft drop.

STEP 3: Size Selection

After determining the flow rate of your system, select the size of unit that is best suited to the installation. If your flow falls outside the specified range, call us at 1-800-463-9572 for custom options.

STEP 4: Shipment & Installation

Once the order has been placed, the Vortex will be shipped to the jobsite along with a full set of detailed installation instructions.

APPLICATIONS

- Sewer Force Main Discharge
- Sewer Wet Wells & Storage Tanks
- Irrigation Ponds