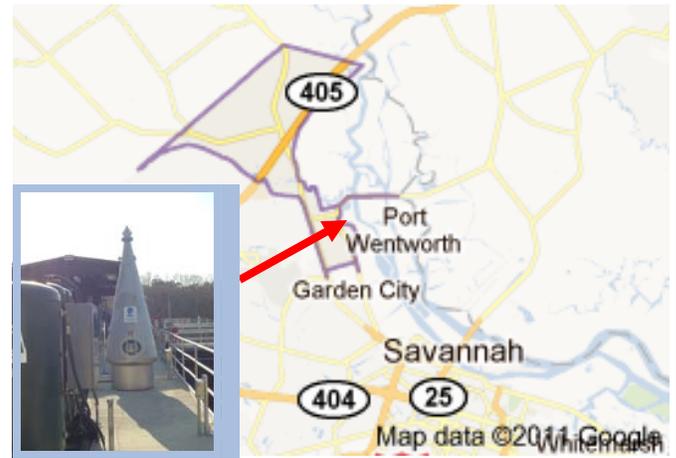


CITY OF PORT WENTWORTH
Port Wentworth, GA

D.O. Supplementation of WWTP Effluent

Project Goal: Net-Zero Ultimate BOD Discharge

Reference: Patrick Burk, PE
Port City Design Group
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Project Description

The City of Port Wentworth, GA is situated on the Savannah River just outside of Savannah, GA. Parts of the Savannah River are considered "D.O. impaired" and are subject to Total Maximum Daily Load (TMDL) and minimum D.O. requirements. No new discharges with a Biological Oxygen Demand (BOD) were permitted into that section of the river.

The City of Port Wentworth desired to build their own treatment plant rather than pay a nearby industry to treat their wastewater. The city proposed a 5 mg/L BOD limit discharge but could not obtain the necessary permits.

The City was faced with three options; 1) continue to pay a third party to treat their wastewater, 2) spend an additional ~\$2 million on tertiary treatment systems or reverse osmosis equipment to reduce the BOD to below 5 mg/L, or 3) offset the 5 mg/L of BOD with dissolved oxygen (D.O.).

Ultimately, the City was granted a permit with a plant design for a **net zero ultimate BOD discharge** by offsetting the 5 mg/L of BOD with D.O. for a net zero impact on the Savannah River.

The City chose ECO₂'s SuperOxygenation Technology to add the required amount of D.O. because of the low cost compared to tertiary treatment equipment and the high oxygen transfer efficiency.

BOD / D.O. (TMDL) Discharge Compliance



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Indianapolis, IN 46240
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www.eco2tech.com

The ECO₂ SuperOxygenation Technology is an innovative, economical and environmentally friendly solution for Dissolved Oxygen (D.O.) Supplementation in lakes, rivers and reservoirs. Applications include D.O. discharge compliance, supplemental oxygenation below powerhouse dams, and injection into the hypolimnion of reservoirs to improve fish habitats and reduce algae blooms. The proprietary ECO₂ Technology is also used for odor and corrosion prevention in wastewater force mains, at headworks and primary clarifiers. Visit our website at www.eco2tech.com to read more about our technology.

Project History

New TMDL Regulations

Under Section 303(d) of the Clean Water Act, every state sets its own water quality standards designed to protect, restore and preserve water quality. When a body of water fails to meet water quality standards after application of required technology-based controls, the Clean Water Act requires the state to place it on a list of "impaired" water bodies and to prepare a TMDL analysis. TMDL requirements should guarantee an optimal environment for the aquatic ecosystem.

The D.O. concentration in surface water has a direct and strong impact on the biological life resident therein, affecting the strength and stamina of fish and other aquatic species. The Savannah River has been an impaired waterway for a number of years, and as such no new discharge permits had been issued despite local growth.

Alternatives

The City of Port Wentworth was faced with three options;

- 1) Continue to pay a third party to treat their wastewater
- 2) Spend an additional ~\$2 million on tertiary treatment systems or reverse osmosis equipment to reduce the BOD to below 5 mg/L
- 3) Offset the 5 mg/L of BOD with dissolved oxygen (D.O.).

Evaluation

The City evaluated all factors that would affect the D.O. level in the Savannah Harbor, including BOD, ammonia, nutrients, and even potential elevated D.O. toxicity to the local wildlife. The permit granted allowed for 5 mg/L of BOD and 1 mg/L of ammonia to be discharged if offset with 30 mg/L of D.O. per 1 MGD of discharge effluent flow.

The required amount of D.O. has been calculated as follows:

Discharge Permit BOD: 5 mg/L Off-set by: 5 mg/L D.O.* Safety Factor of 5 = 25 mg/L D.O.
Discharge Permit NH₃: 1 mg/L Off-set by: 4.6 mg/L D.O. = 4.6 mg/L D.O.
For a Total Ultimate Oxygen Demand of 29.6 mg/L per MGD.

Results

In order to achieve the required D.O. levels in their plant effluent, the City of Port Wentworth chose the ECO₂ SuperOxygenation Technology to efficiently and affordably meet their permit requirements.

Costs for the ECO₂ System were less than 20% that of otherwise required tertiary treatment equipment.

Using the Net-Zero Ultimate Oxygen Demand is an economically feasible, yet responsible approach to meeting TMDL guidelines and improving water quality.

The ECO₂ System adds enough D.O. to the plant's effluent to off-set any residual BOD - which enabled the City to receive their discharge permit and build a new WWTP.



Installation of ECO₂'s Speece Cone



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TECHNICAL SPECIFICATIONS

Cone Diameter:	4 ft
Cone Height:	12 ft
Oxygen Dissolution Rate:	700 lbs/day
Sidestream Flow Rate:	750 gpm
DO Discharge:	82 mg/L
Oxygen Transfer Efficiency:	95 %