



## Headworks BIO MBBR Wastewater Treatment Solution for 5-Star Resort Introduction

The only waterpark resort in Cebu, the Imperial Palace Waterpark and Spa Resort, offers 556 elegantly furnished rooms for your enjoyment. All guests love amenities such as pools, swimming ponds and parks, but these facilities require high maintenance. Moreover, hotels produce domestic wastewater as well. Depending on occupancy rates, the Imperial Palace for example can generate an average of 1500 m<sup>3</sup>/d of waste water requiring treatment.

Headworks BIO's technical experts address all these challenges and many more to offer complete solutions for biological wastewater treatment for hotels and resorts. For this reason, Headworks BIO was selected to implement a new treatment plant system for the Imperial Palace Waterpark and Spa Resort.

### Process

The Headworks BIO system for biological wastewater treatment utilizes moving bed biofilm reactor (MBBR) technology and provides a space-saving and easy to operate solution for wastewater treatment and reuse. The process enables the cleaning of wastewaters from the sanitary areas and pools sustainably in an environmentally friendly way and without chemicals. The process is cost-efficient since the discharged water can be used for irrigation of parks and lawns.

**QUALITY THAT NEVER QUILTS™**



Customer: Imperial Palace Hotel  
Industry: Industrial, Resort

### KEY FACTS

- **Wastewater Flow:** 300 m<sup>3</sup>/day (0.079 MGD)
- **BOD<sub>5</sub>:** Design influent 400 mg/L  
Final effluent < 40 mg/L
- **COD:** Design influent 800 mg/L  
Final effluent < 80 mg/L
- **TSS:** Design influent 400 mg/L  
Final effluent < 60 mg/L
- **pH:** Influent 6.0 – 8.5  
Effluent 6.5 – 7.5
- **Temperature:** 15 – 30 °C (59 – 86 °F)

## Challenges

Seasonal fluctuations typical for hotels often overburden wastewater treatment plants. Off-season the biological degradation processing capacity necessarily declines with less biological matter to consume. During the main season, stream volume and biological load of inflowing wastewater again increase, often suddenly. Depending on the time of the year, conventional adaptation of the degradation capacity usually takes place over several weeks, too long a period to keep the treatment consistent. During this time legal requirements for discharge values cannot be met by conventional treatment systems and cost-saving direct discharge into surface waters or odor-free irrigation of lawns become impossible.

The existing wastewater treatment facility at the Imperial Palace treated approximately 1200 m<sup>3</sup>/d utilizing the SBR technology; however, since the resort itself was undergoing expansion there was a shortfall in treatment capacity of around 300 m<sup>3</sup>/d. It was, therefore, decided that a new wastewater treatment plant would be required to handle the increase in wastewater flow.

The key drivers for selection of the best available treatment technology were ease of operation, space saving, ability to produce consistent effluent quality suitable for reuse, low operational and life cycle costs, and a technology which could handle shock loads due to seasonal fluctuations. The new treatment plant was also designed to handle not only high

strength wastewater, but also large weekly variations in flows and loadings due to the hotel and spas. In addition, to minimize visual impact and potential for odor generation, it was concluded that the wastewater treatment facility would be built completely underground!



*Headworks BIO's MBBR technology with ActiveCell® media.*

## Solution

Due to limited land space and the requirement of an easy to operate treatment plant producing high quality effluent, a Headworks ActiveCell® two stage MBBR system was selected for the biological treatment process.



*Final effluent storage tank at the Imperial Palace Resort after MBBR system installation.*

## Results

The wastewater treatment plant was started up in February of 2013 and has exceeded expectations. The Headworks ActiveCell MBBR has consistently met all treatment performance objectives for energy savings and effluent quality. Solids wasting from the plant has been minimal, and there has been no requirement for chemical dosing. Despite the seasons variations the plant copes extremely well with the fluctuating incoming loads.

“*The facility produces excellent effluent water quality suitable for reuse at the resort resulting in a huge cost savings.*”

*- Arch. Tonette Senagan  
Director of Engineering at  
Imperial Palace*