



Water solutions for the world.

Higashi Honganji Temple in Kyoto

ALGAL BLOOM PREVENTION AND
WATER QUALITY IMPROVEMENT

WITH NANOBUBBLES AND
PROBIOTICS. AT A MOAT IN A
TOURIST AREA.

KYOTO MOAT HISTORY

A temple with a beautiful moat in Kyoto, Japan had a group of volunteers maintaining the moat, by cleaning it and doing regular maintenance. Due to the older age of the volunteers, the group stopped moat maintenance around 1998. In the next 20 years no maintenance was done and year by year the situation worsened. On one hand natural pollution wasn't removed such as leaves in autumn and excessive uncontrolled water plants growth took place.

On the other hand, tourism in Kyoto was on the rise and more and more, litter came in the moat. This led to an uncontrolled situation of bad smell, fish mortality, opaque water and the bottom of the moat was invisible. In the summer, algal blooms were becoming more and more frequent.

before

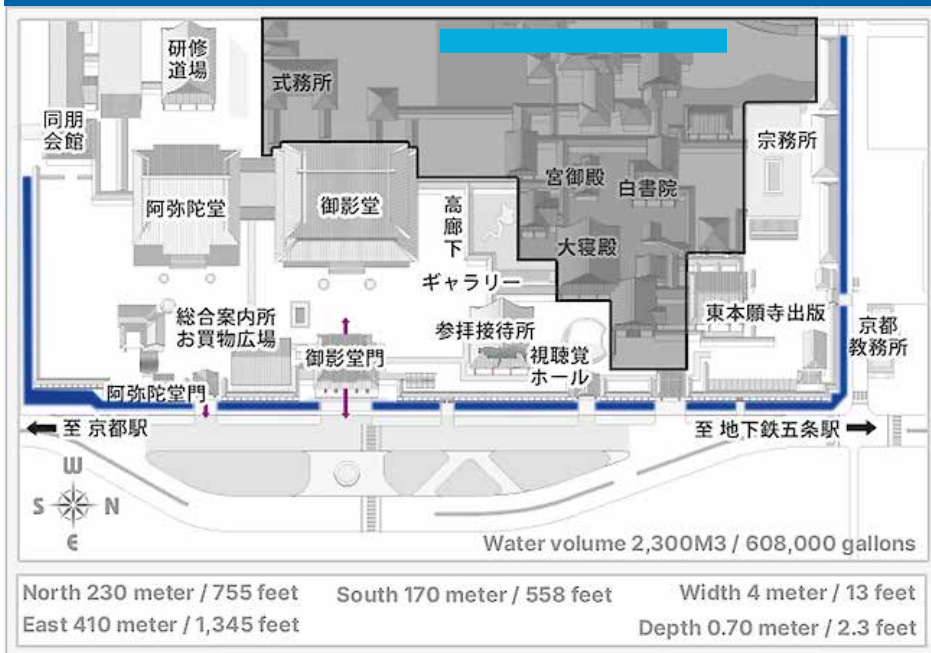


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810 meters moat

The Higashi Honganji temple in Kyoto, located nearby the Central Station of Kyoto, was established in 1602. It has a long history and contains one of the tallest wooden structures in the world, it also has burned down a couple of times. Around the temple grounds is a moat of which has a length of 810 meters.



As it's a touristic hotspot for both Japanese and international visitors, it's important that the water looks clean and doesn't disturb the visitors and neighborhood with bad smell. The water for the moat is coming from Lake Biwa the largest sweet water lake in Japan. The water is transported via an ancient underground water network. When the water is arriving at the Higashi Honganji temple, it's pumped into the moat on the north side of the temple, after which the water slowly travels to the south side of the moat and continues elsewhere.



NANO BUBBLES & PROBIOTICS AND CLEANING PLAN

In 2018, contact was made with the gardener and management of the temple and a plan was drawn up to bring the moat to a healthy state. The plan consisted of:

- Removing of excess natural pollution in spring and autumn, from blossom and leaves
- Removing excess water plants once or twice a year, which stops the flow in the moat
- Putting signs at the taxi stand to not pollute the water
- Cooperation with the gardener during maintenance periods, no plant debris goes into the water.
- Putting 2 submersible nanobubble aeration devices with oxygen concentrators
- A natural probiotic spray program with low intensity application in winter and higher application during spring and summer.

before



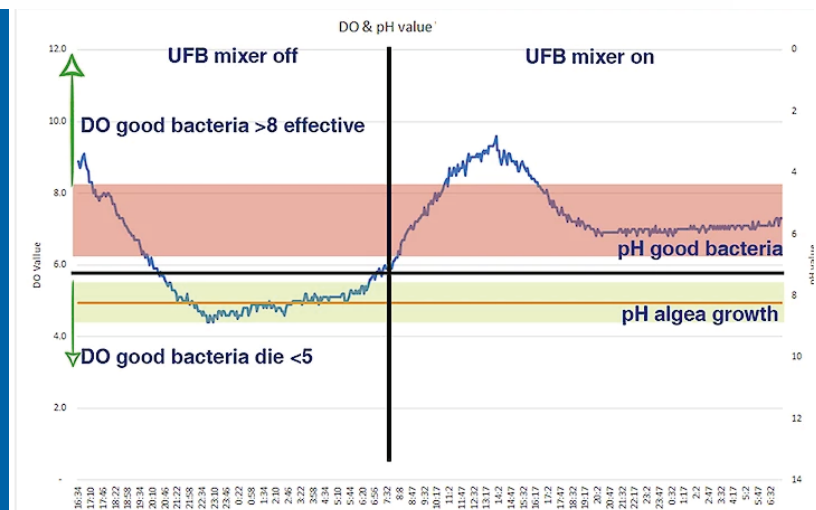
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RESULTS

Three months into the project the results became visible. No more smell and fish mortality, and the water color went from opaque to transparent clear. Depending on the climate conditions in spring and summer, there is a more intensive cleaning program with longer hours for operating the nanobubble generator. During the summer, peak they run max 13 hours from 6 PM to 7AM always around sunset till sunrise.

During the summer day time natural oxygen production is sufficient, the problems are always during the night when the photosynthesis doesn't produce any oxygen. In the first year we noticed that DO levels went from 4.5 ppm to 9 ppm. The application of probiotics is in summer more intensive than during the winter period. In Spring and Autumn, the application is 2x a month, during summer 2 or 3 times and in winter applied every 8 weeks.



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