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## Domestic Wastewater Treatment Plant Biopipe for Narkoy Ecological Hotel

A CASE STUDY OF BIOPIPE

### Introduction

Narköy is the branch of Nar Education and Consultancy company, sustainable tourism center and organic farm.

Narkoy is projected in Kandıra where is 2 hours distance to Istanbul. It is a concept project and composed of hotel, school ( workshops for companies) and a farm.

Their one of the major problem is the lack of infrastructure and a excessive landscape area. Another main issue is to take more point of LEED certificate, treatment of black water is a 'must'.

Biopipe's solution is treat all domestic wastewater and capability of using treated water in agriculture / farm part and help to get points.



### Key Data

**Project:** Narkoy Ecologic  
Hotel

**Plant Type:** Treatment of  
domestic wastewater in  
hotel and school.

**Project Capacity:**  
20m<sup>3</sup>/day – 100  
person/day

**Use:** Recycle wastewater  
to reuse in agriculture by  
under < 20 BOD/day mg/lt  
water.

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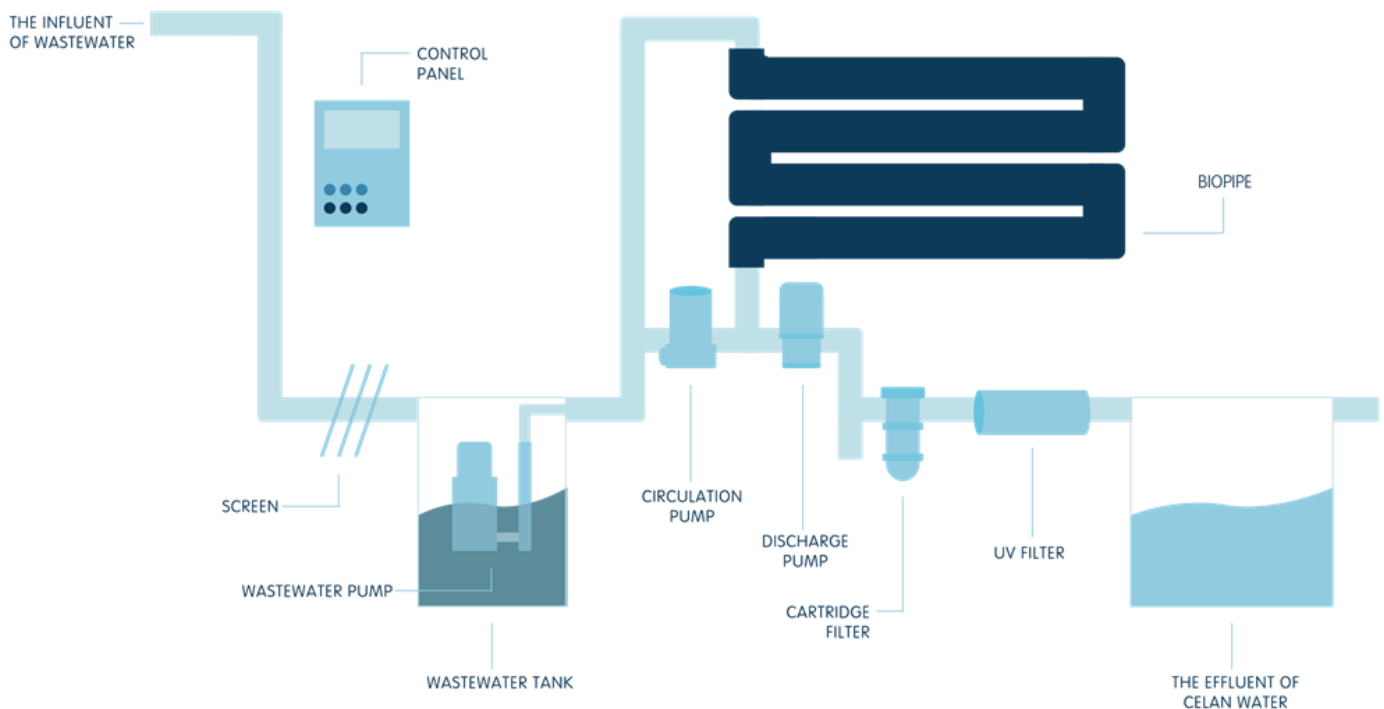
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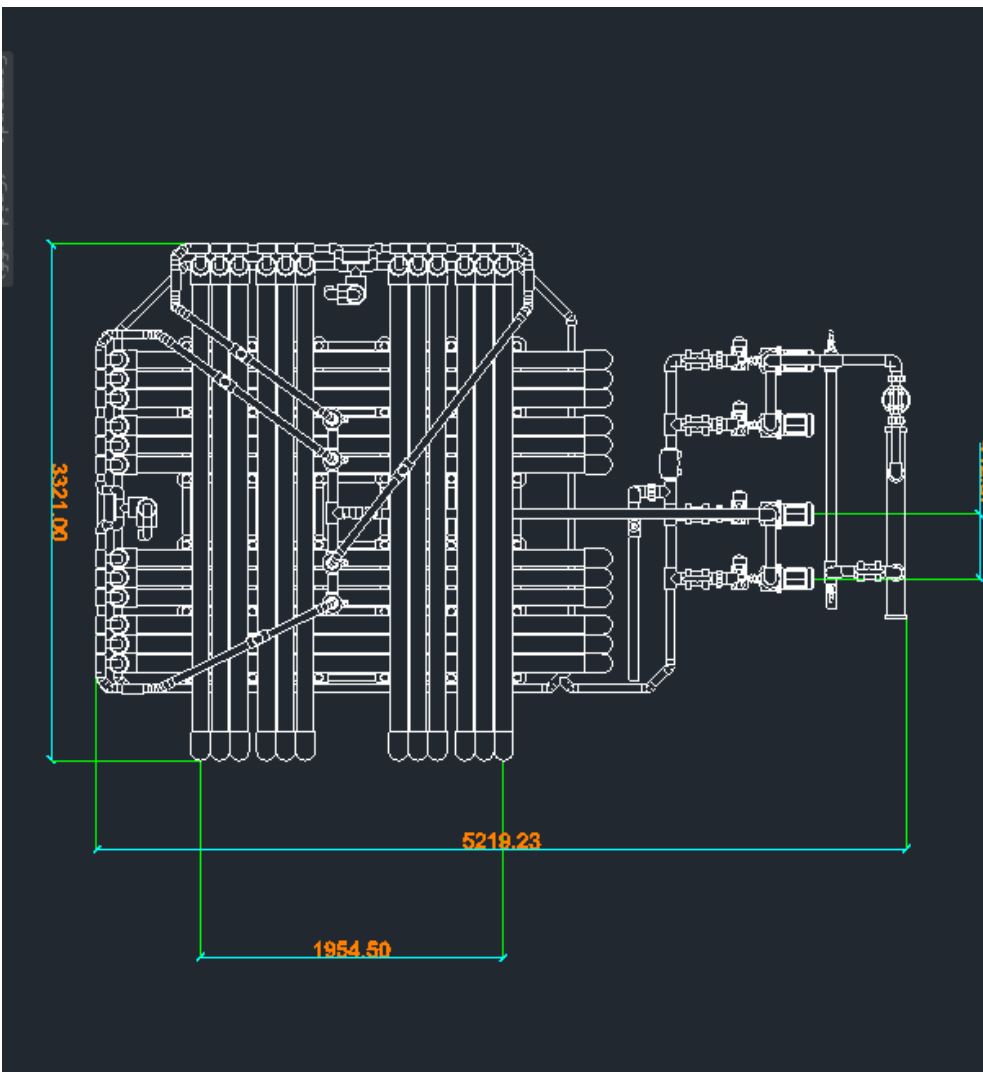
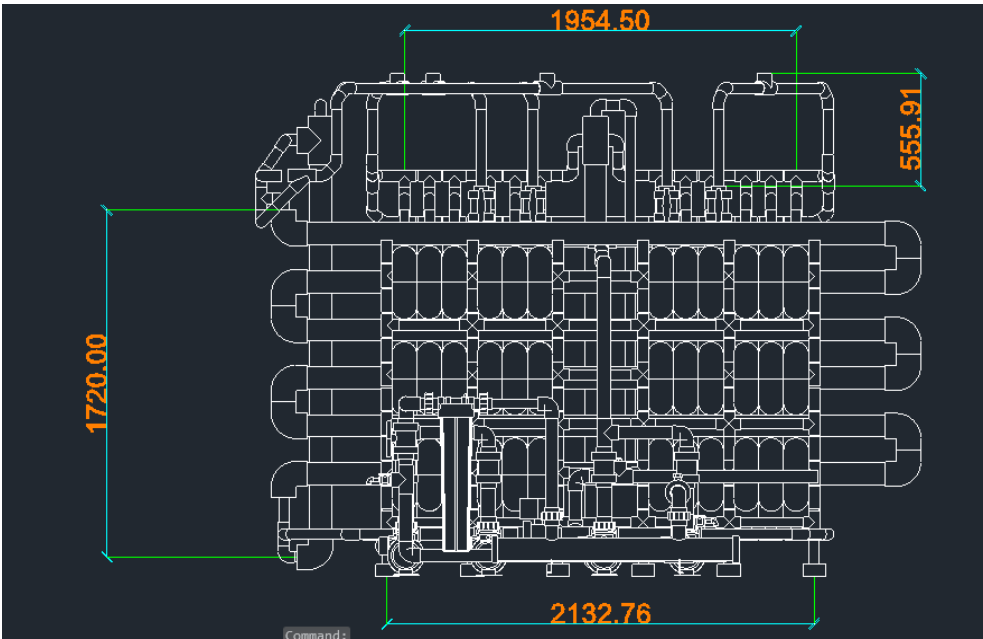
# BIOPIPE

Biopipe is the first biological wastewater treatment where the process takes place entirely inside the pipe. With a simple design and effectual treatment, Biopipe works as on the below;

1. An equalization water tank is used to store domestic wastewater with inorganic and organic substances. Depends on system capacity screen and sand separator are used before equalization tank.
2. Wastewater reaches the operational level in the tank, the wastewater pump pumps water to circulation pump.
3. When Biopipe becomes full, circulation starts and treatment begins. Biopipe bacteria engages with pollutants and eliminates them from wastewater during circulation while 'air is automatically vacuumed by the pressure difference in order to allow aerobic bacteria to further treat the wastewater.
4. Wastewater then passes through a disc filter (cartridge filter) and an UV filter to complete treatment. The treated water can be used directly or stored in a clean water tank.

Biopipe is remote controlling, flexible – modular design, eco–friendly and sustainable treatment system. A large scale of usage capacity, starts with 1 m<sup>3</sup> / day to municipalities.





System Area:

20m<sup>2</sup>

System Dimensions:

3,4m x 6m x 2,5m

Wastewater Tank  
(needed):

10m<sup>3</sup>

Clean Water Tank  
(needed):

10m<sup>3</sup>

## ENVIRONMENTAL BENEFITS

Thanks to Biopipe bacteria, all organic particles inside domestic wastewater are consumed during circulation period of treatment. Circulation period occurs after wastewater pump reaches to water to circulation pump. At the end of 2 – 4 hours treatment stage, only clean water is produced. The main benefit is to not have to do waste management, consume more energy and more man – power. Therefore, customer does not have to solve noise pollution and odor, which Biopipe does not produce. The aeration of Biopipe is provided with venturi system instead of blower. This is induced that comparing with other market treatment plants, Biopipe operating cost is much more less.

In addition, Biopipe is classified to be an innovative wastewater treatment technology that makes the end user achieve the requirement to get LEED accreditation related to water efficiency and water re-use applications.

In this project's region, there is an infrastructure but want to LEED certificate. Recycling of black water is caused to get much more points than grey water treatment from LEED.

Biopipe flexible design option, system is installed in parking garage and total area is consisted only two cars.



## Scope of work

Briefly, Biopipe is the domestic wastewater treatment system that recycles wastewater into a water appropriate with a biological method ( biofilm ) in a U-PVC pipes.

Difference of Biopipe is made this without sludge production, low operationg and maintenance cost.

With modularity option of Biopipe, system can be divided and installed different camps.

### **Biopipe is installed in Narkoy Ecological Hotel Project, Biopipe capacity 20m<sup>3</sup>/day.**

The scope of work included complete design, engineering service, supply, installation, and commissioning and finalize with performance test.

- Physical Treatment with basket screen
- Biological Treatment on Biopipe support with circulation and discharge pump.
- Discharge of Water under EU standards after pass through disc and UV filter.
- Biopipe Effluent Water Quality is;
  - BOD: < 20 mg / lt
  - COD: < 30 mg / lt
  - TSS: < 10 mg / lt
  - pH: 6 – 9

**With Biopipe, 7300 tonnes of water can be saved and used for irrigation on 3334 m<sup>2</sup>. Result of this, Biopipe amortizes itself in 10 months.**

# BIOPIPE TREATMENT STAGES

## Physical Treatment

In this system, screen option is presented but wastewater is accessed to system on a very high point and catches large inorganic particles.

## Biological Treatment

As it can be seen on the flow chart, the wastewater pump reaches water to circulation pump under controlling by Control Panel. With the circulation pump, Biopipe bacteria engage with the wastewater and consume organics. This project needs to be under  $< 20$  mg / lt BOD effluent water, accordingly the circulation period is determined.

## Final Stage

Treated water is discharged by discharge pump. After the pump, any inactive bacteria have detached from biofilm layer are captured by a 100 micron cartridge filter and by going through UV filter. As a results, water standards are seized.



\*Layout of system