

Bodrum Konacik Municipality



Site is situated in Konacik Municipality adjacent to Bodrum.

Plant Description

- The first flat sheet membrane treatment plant for a municipality in Turkey.
- Totally enclosed plant located in hillside for minimal environmental impact.
- Effluent quality achieved meets the most stringent reuse requirements.
- The MBR contract agreement provided for the process design, specification and supply of flat sheet membrane units
- Additional services provided were M&E design assistance, inspections during installation, assistance to start-up, commissioning and membrane maintenance advice plus operator and management training.

Status:	Fully operational
Client:	Konacik Municipality
Commissioned:	February 2009
Discharge Consent:	BOD < 5 mg/l, N total <10 mg/l zero parasites
Performance:	First month operation BOD <10mg/l, TKN < 7 mg/l, SS << 5 mg/l
Brief Description:	Prestige totally enclosed plant to produce effluent for reuse

MBR Atıksu Arıtma Sistemleri Ltd.

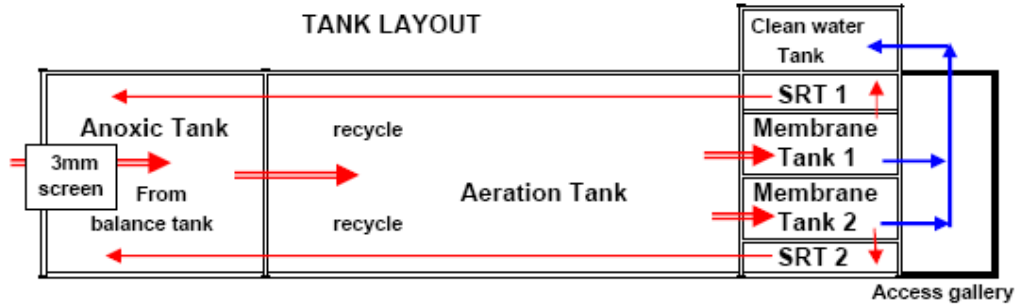
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Tanks are of concrete construction, partially below ground and fully enclosed in buildings. Balance tank feeds process via fine 3mm bi-directional screen. The single stream treatment process has an aeration tank and two membrane tanks. Treated effluent flows by gravity to the clean water storage tank for reuse. Screenings and inlet areas odour controlled. Plant designed to operate automatically with minimal supervision.

Design Requirements

Influent average loadings:

BOD	375 mg/l
COD	800 mg/l
TKN	45 mg/l
NH ₃ – N	40 mg/l
SS	300 mg/l
TDS	5,000 mg/l

Effluent standards

BOD	5 mg/l
Total N	10 mg/l
Total P	1 mg/l
NH ₃ – N	2 mg/l
SS	5 mg/l

Plant Data

Maximum daily volume	3,200 m ³ /d
Average Daily flow	1,600 m ³ /d
Peak flow	4,800 l/sec
MLSS membrane tank	12,500 mg/l
MLSS aeration tank	4,170 mg/l
Membrane units	8 x EK400
Membrane surface area	2,560 m ²
Sludge age	25 days
Sludge produced	19 m ³ /d

Current performance

COD	<60 mg/l
BOD	<5 mg/l
Ammonia	<5 mg/l
TKN	<7 mg/l

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Process Description

MBR Atıksu Aritma Sistemleri (MBR) were contracted to supply the process design and membranes plus general assistance to the project contractors selected by the municipality via the tendering procedures.

The process chosen by MBR to meet the required effluent standards was conventional biological reduction with liquid/solid separation by membranes (To ensure no cryptosporidium or parasites in the treated effluent thus enabling discharge to sensitive environment or re-use for irrigation.)

Flat sheet membranes were selected for the membrane duty as these perform best on waste liquids with less blockages.

The process is in three stages:-

1. Pre treatment: grit removal and screening:

3mm bidirectional screens were specified after standard bar screens to ensure no particulates potentially damaging to membranes were passed into the biological stage, similarly grit removal of >95% particle 0.2mm and above was specified.

2. Biological treatment:

The reduction of BOD, N and P biologically was achieved by conventional nitrification/denitrification process but with f;m ratio set at 0.05 to ensure >99% BOD removal and MLSS at 12,000mg/l to minimise tank sizes.

3. Liquid solid separation by membranes:

Membranes are specified to ensure quality and clarity of treated effluent. Typically membrane plants provide treated effluents with Turbidity lower than drinking water (>0.5NTU), also TSS, BOD and NH₃-N<5mg/l.

The membrane pore size also guarantees the removal of all parasites and Cryptosporidium cysts plus coliform reduction >10⁷. This means the treated effluent meets all local and international standards for unlimited irrigation and even discharge onto EU designated Bathing Beaches.

The role of MBR

For the Konacık project MBR co-tendered with a number of contractors as the process design company with responsibility for specifying and supplying the membranes.

The client, with the support of İller Bank, had already decided to include membranes in the tender to meet the treated effluent requirements. (MBR had previously presented membrane solutions to waste treatment problems to İller Bank.)

MBR are able to offer these services without conflict to a range of M&E contractors as MBR does not M&E contracting.

Additionally MBR provided support and advice to the selected contractor to assist with installation and commissioning.

The client also requested support for operator training and plant management.

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