

Project Profile

Aquatech's First Integrated Biological & Membrane Water Recycle Project at Mumbai International Airport

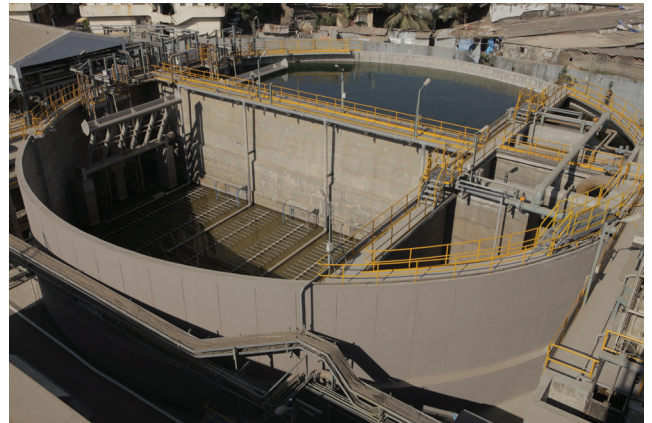
The Facility

The year 2006 witnessed a momentous change for airports in India with the privatization of Mumbai's Chhatrapati Shivaji International Airport (CSIA). Being the financial capital and a key gateway of the country, expansion & modernization of CSIA holds great significance, with a vision to become one of the world's best airports. Mumbai International Airport Limited (MIAL), a GVK Industries Ltd. led consortium, has partnered with well-known international experts for its airport design and operations. A key requirement of the development plans has been that the project be executed without disturbance to the standard airport operations & within limited timelines.



Project Overview

The new Common User Terminal (CUT) is to be constructed in a phased manner. Environmental regulations have made mandatory the treatment of raw sewage before allowing it to flow into the natural ecological system. The scarcity of fresh water availability has also necessitated that sewage be treated for recycle and reuse. The treated sewage will be recycled and used for flushing, horticulture and as make up water for Cooling Towers for HVAC. A key challenge for Aquatech has been to accommodate its wastewater recycle system within the restricted space available and completion of the turnkey project within a limited time without disturbing airport operations.



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Scope of Service

Aquatech, with technology back up from AECOM UK for biological system, came up with some of the most creative engineering designs to accommodate the plant in a limited space. AECOM's Cyclic Activated Sludge System (CASS™), an advanced Sequencing Batch Reactor (SBR) process, was deployed in the project. The circular design of CASS™ basins helped to optimize the space efficiently. The skid mounted units also led to speedy project execution.

CASS™ is a combination of biological selector and variable volume reactor process and it operates with a single sludge in a single reactor basin to accomplish both biological treatment and solids-liquid separation, thereby minimizing the plant footprint.

Aquatech's Sewage Treatment Plant (STP) is designed and constructed to treat daily sewage flow of 10,000 m³/day. The process consists of a Sequential Batch Reactor followed by advanced tertiary treatment systems based on UF and RO processes.

A simple repeated sequence of aeration and non-aeration is used to provide aerobic, anoxic and anaerobic process conditions, which in combination with the controlled aeration intensity, favor nitrification, denitrification and biological phosphorus removal. Each CASS™ SBR aeration basin is provided with one or more Vari-skim™ effluent decanter constructed from stainless steel and fitted with a scum guard.

Design Water Analysis

Feed Water Analysis

Description	Units	Raw Sewage
Temperature	°C	Ambient
pH	---	67-8.1
BODS at 20°C	mg/l	100-260
COD	mg/l	120-450
Total dissolved solids	mg/l	200-700
Total suspended solids	mg/l	65-250
Total Kjeldahl Nitrogen	mg/l	5-60
Ammonical Nitrogen	mg/l	2-40
Hardness as CaCO ₃	mg/l	50-100
Sulphate	mg/l	40-110
Chlorides	mg/l	100-300
Oil & Grease	mg/l	<10
Total Alkalinity	mg/l	150-375
Silica	mg/l	5-30
Phosphorous	mg/l	5-7

Treated Water Quality

Description	Units	After Biological Treatment	After RO (for HVAC use)
Temperature	°C	Amb	Amb
pH	---	7.0-8.0	7.0-8.0
BOD at 20 °C	mg/l	--	BDL
COD	mg/l	--	BDL#
Total dissolved solids	mg/l	<=700	< =150
Total suspended solids	mg/l	--	BDL
Total Kjeldahl Nitrogen	mg/l	<= 10	<=2
Ammonical Nitrogen	mg/l	< =2	<=1
Oil & Grease	mg/l	<= 5	BDL
Phosphorous	mg/l	<2	<2

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Process Flow Diagram

