



# NET ZERO WATER - SOBHA CITY, THRISSUR

- Prasanna Venkatesh



Figure 4 : Aerial View of Artificial Lake and Buildings around the lake, at Sobha City, Thrissur

## Introduction

Sobha City, located in Thrissur, Kerala is an integrated township project consisting of apartment buildings, villas, mall, clubhouse and commercial developments. The project has been in operation since 2015 and currently around 90% of the project has been completed and in operation.

At Sobha City, Thrissur, we have taken significant steps, going beyond legal obligations, to not only mitigate any negative impact on the environment but also to create positive living spaces that enhance the local environment, e.g. Artificial lake for Rainwater Harvesting (191 ML capacity), Solid Waste management with Organic Waste Converter for biodegradable waste and Incinerator for inert wastes, Extensive landscaped areas etc.

The project does not source water from any external source and caters to the entire water demand of the project through alternate water i.e. Rainwater harvesting and treated wastewater from Sewage Treatment plants.

The project was born out of an idea envisioned by our

Founder & Chairman Emeritus, Mr. PNC Menon way back in 2006; the 6.5-acre lake was conceived in such a way that all the water needs for residents including landscaping are met without dependence on municipal water or other sources considering normal annual rainfall.

The project has been recognized for this accomplishment by the Indian Green Building Council and was awarded India's First 'Net Water Positive (Platinum)' certification under IGBC's Net Zero Water rating system for operational Buildings in Residential category.

## Basic Information

Site Area . . . . .	55 Acres
Built-up Area . . . . .	2,22,899 sq.m
Apartments . . . . .	720 nos.
Villas . . . . .	25 nos.
Plots . . . . .	31 nos.
Mall . . . . .	1 no.
Clubhouse . . . . .	1 no.
Green Area . . . . .	68077.41 sq.m



## Water Management @ Sobha City, Thrissur

### A) Reducing Water Demand

Entire water demand at Sobha City, Thrissur including Domestic, Flushing and Irrigation water is met through alternate water viz:- Harvested rainwater and Treated wastewater from in-situ Sewage Treatment Plants (STPs). The annual water balance for the project is provided below:

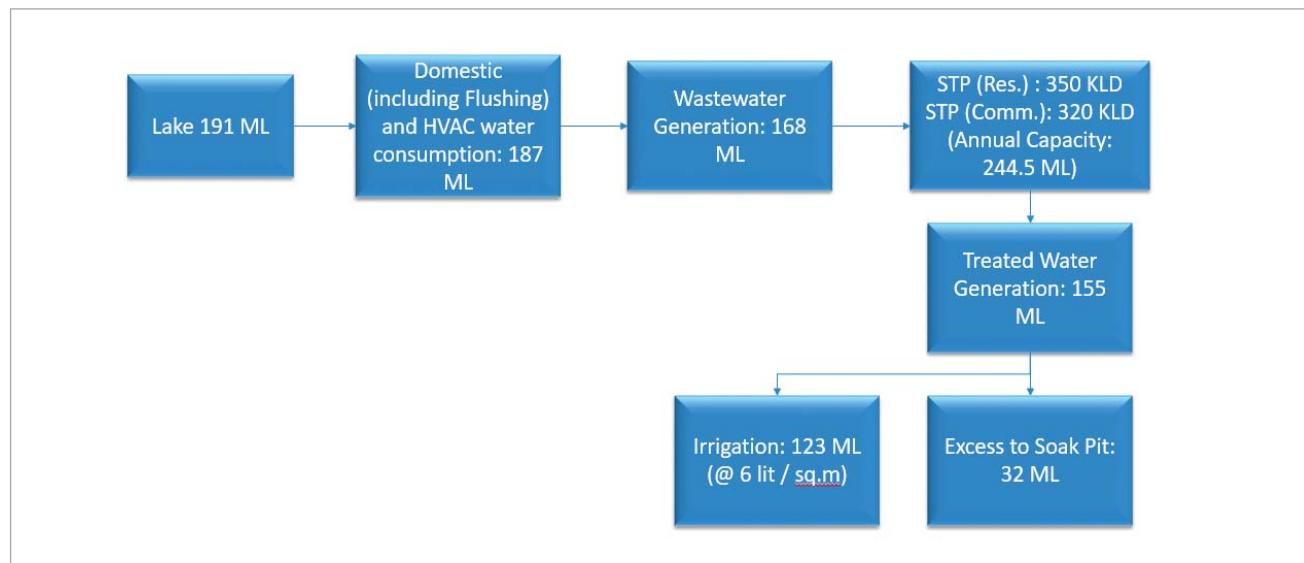


Figure 1: Water Balance

#### i) Rainwater Harvesting System

At Sobha City, an artificial lake spread over 6.5 acres has been provided with a holding capacity of 191 ML. The lake has been designed to cater to the entire freshwater demand of the project.

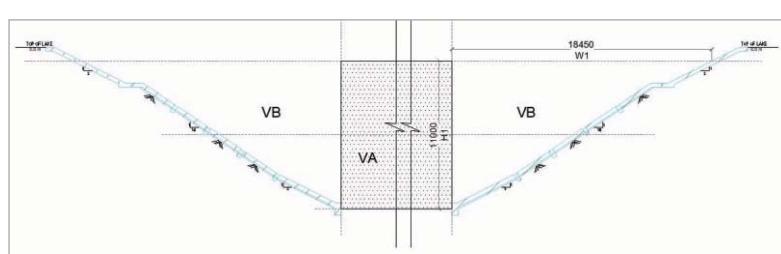
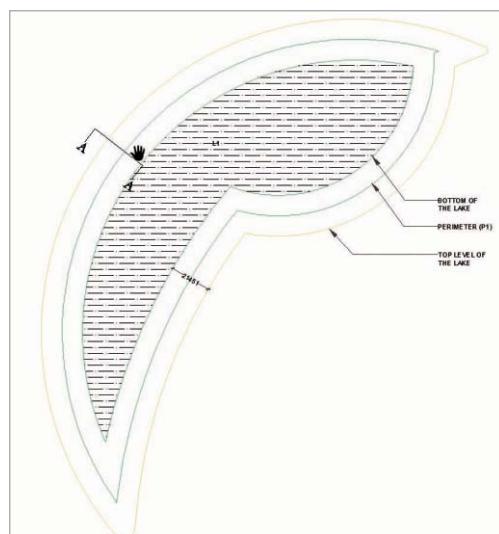


Figure 3: Lake Plan and Section



The monthly lake volume after rainfall and consumption is provided below. The rainfall data has been sourced for Thrissur district from Indian Meteorological Department (IMD) and the water consumption data are actual metered readings over the period December 2020 to March 2021.

MONTHLY LAKE VOLUME CALCULATION								
SI No	MONTHS	RAINFALL, RUNOFF AND WATER DEMAND DATA			I year	II Year ONWARDS		
		Avg. Rainfall Intensity (mm)*	VOL. FROM Avg.RAINFALL (ML)	WATER DEMAND (ML) <sup>#</sup>		VOL. IN LAKE (ML)	VOL. INTO LAKE (ML)	VOL. AFTER OVERFLOW (ML)
1	JUN	548.9	86.25	14.4	71.83	210.54	191.3	19.20
2	JUL	516.38	81.14	14.8	138.15	257.67	191.3	66.33
3	AUG	574.28	90.24	13.3	191.34	268.28	191.3	76.94
4	SEPT	308.68	48.50	16.2	191.34	223.63	191.3	32.29
5	OCT	259.36	40.75	18.3	191.34	213.75	191.3	22.41
6	NOV	71.22	11.19	15.6	186.90	186.90	186.9	0.00
7	DEC	19.94	3.13	14.0	176.08	176.08	176.1	0.00
8	JAN	2.86	0.45	15.2	161.30	161.30	161.3	0.00
9	FEB	1.84	0.29	15.0	146.55	146.55	146.6	0.00
10	MAR	23.28	3.66	15.6	134.65	134.65	134.6	0.00
11	APR	51.72	8.13	17.3	125.51	125.51	125.5	0.00
12	MAY	196.76	30.92	17.7	138.72	138.72	138.7	0.00
			404.64	187.46				217.18

Note :

- 1. \*Source: Indian Meterorological Department (<https://mausam.imd.gov.in/>) . Rainfall value averaged over past five years (2016-2020)
- 2. ML= Million Litres

Table 1: Monthly lake volume calculation after consumption

## ii) Water Treatment Plants

Water Treatment Plants (2 nos.) with RO have been provided in the project to treat the rainwater harvested in the artificial lake, before supplying to end users. This ensures that end users do not have to install individual Purifiers in their dwelling/ commercial units leading to wastage of water. The lake water undergoes a five-stage filtration in the WTP viz: through Pressure Sand Filter (PSF), Activated Carbon Filter (ACF), Softener, Ultra Filtration and Reverse Osmosis. The water from the lake is treated in the WTPs to drinking water standards as per IS 10500:2012



Figure 5: Water Treatment Plant

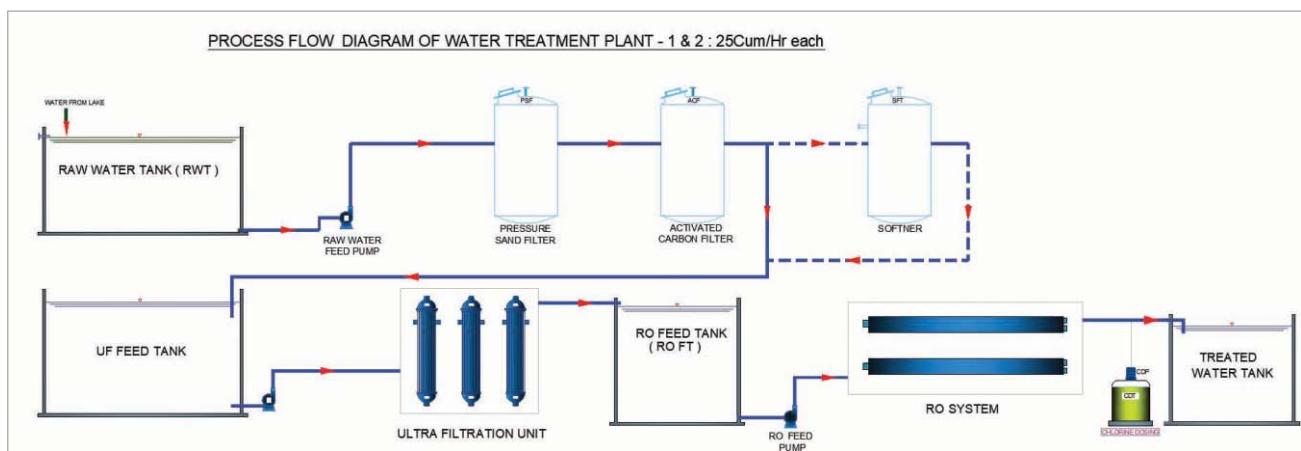


Figure 6: WTP Process flow diagram



### iii) Water Metering

Water metering data empowers the estate managers with knowledge of their water consumption patterns and enables them to take active steps towards water conservation. Water meters have been provided in the project to monitor consumption of domestic water (WTP treated lake water), HVAC and treated water for irrigation. Currently, since domestic water is being used for flushing as well, flushing water is not monitored separately. However, considering future needs when recycled water is used for flushing, water meter has also been provided for monitoring flushing water demand.



Figure 7: Water Metering

### iv) Sewage Treatment Plants

Sewage Treatment Plants (STPs) have been provided in the project to treat 100% of the wastewater generated in the project in-situ. Currently two STPs of capacity 350 KLD and 320 KLD are operational to treat the entire wastewater generated in the project. The treatment process is based on Sequential Batch Reactor (SBR) technology (350 KLD STP) and Activated Sludge Process (ASP, 320 KLD mall STP) with provision for ultrafiltration (UF). The technology ensures that the treated water generated meets the state pollution control board's norms and is fit for recycling for secondary purposes.

The treated wastewater is used for irrigation purposes; however dual plumbing lines have been provided in the project to use the water for flushing in the future.

### B) Water Performance Ratio

The project's alternate water consumption or the Water Performance Ration (WPR) is 100%. The project has no dependence on external water sources. The Water performance ratio is demonstrated as follows:

Total storage capacity of Artificial Lake= 191.32 ML

Total water sourced from lake for Domestic, Flushing and HVAC purposes (A) = 187 ML

Total recycled water used for landscaping (B)= 123 ML

Total Alternate water used annually (C=A+B) = 187 ML + 123 ML = 310 ML

Total Raw water use = 0 ML

Hence, % Use of Alternate water (Water Performance Ratio) =  $(310/310) * 100 = 100\%$

### C) Water Back to Source

At Sobha City, Thrissur, all roof and non-roof runoff is directed towards an artificial lake of storage capacity of 191.32 ML. The overflow of the lake is connected to an irrigation channel abutting the site.

Based on rainfall data of the past five years for Thrissur,

- Total run-off generated = 405 ML
- Total storage capacity of lake = 191 ML
- Excess to irrigation channel = 214 ML

The water from the irrigation channel is used by agricultural fields in the vicinity for irrigation. Besides, as per scientific studies (references attached) water used for irrigation also serves to recharge the local aquifer.

The lake water is supplied for domestic purposes after treatment in two Water Treatment Plants (WTP). The water so treated is used for flushing and HVAC purposes as well. Raw water is not used for any purpose in the project. The wastewater generated in the project is treated in Sewage Treatment Plants (STPs) and used for irrigation purposes.

Hence,

- Quantity of Water Recharged = 0 ML
- Quantity of Water Returned
  - Total treated wastewater used for irrigation annually within the project= 123 ML
  - Total annual overflow to the irrigation channel for use in agricultural fields= 214 ML
  - Total Quantity of Water Returned= 337 ML



iii) Total Raw Water Consumption in the project = 0 ML  
Therefore,

Ratio of Water Back to Source for Use = (Water Recharged + Water Returned)/ Total Raw Water Consumption =  $(0 + 337)/0$   
 $=337/0 = \infty$  or Undefined,  
which is  $>1.2$

#### D) Net Water Positive Certification

The project in addition to no dependence on any external source of water, also manages to divert excess stormwater to nearby irrigation channels thus benefiting the community. In recognition of the same, the project was awarded Net Water Positive Certification by the Indian Green Building Council (IGBC) under the IGBC Net Zero Water rating system

which is the First in the country for any operational Residential Building category.

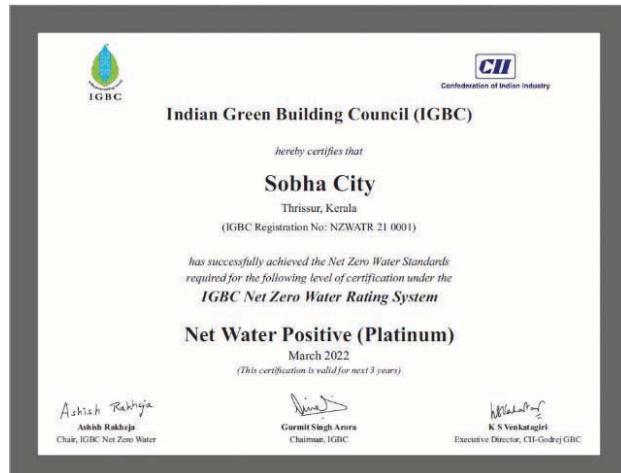
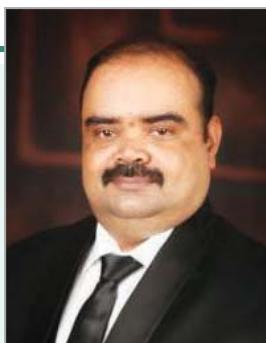


Figure 8: Net Zero Water Certificate, receiving plaque from Gurmit Singh Arora, National Chairman and other office bearers of IGBC.



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