

An aerial photograph showing a river or stream winding through a vast, dense green forest. The water is a light blue-green color, contrasting with the deep green of the surrounding trees. The forest appears to be a mangrove or a similar wetland environment. The river flows from the top right towards the bottom center of the frame.

Our Water Body

How do we restore our Water body in
Riviera

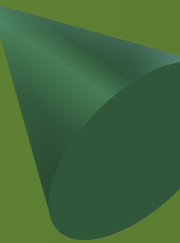
Girish S Kumar



Objectives



- Restoration of our water body with full of water.
- Environmentally safe water body
- Maintain a hygienic and a clean water body
- Compliance with BWSSB and Govt agencies
- Work with limited budgets
- Ensure water availability round the year





Challenges

1. Leakage in water body towards basement –
Solved

2. Source of clean & affordable water. (**Not Solved**)

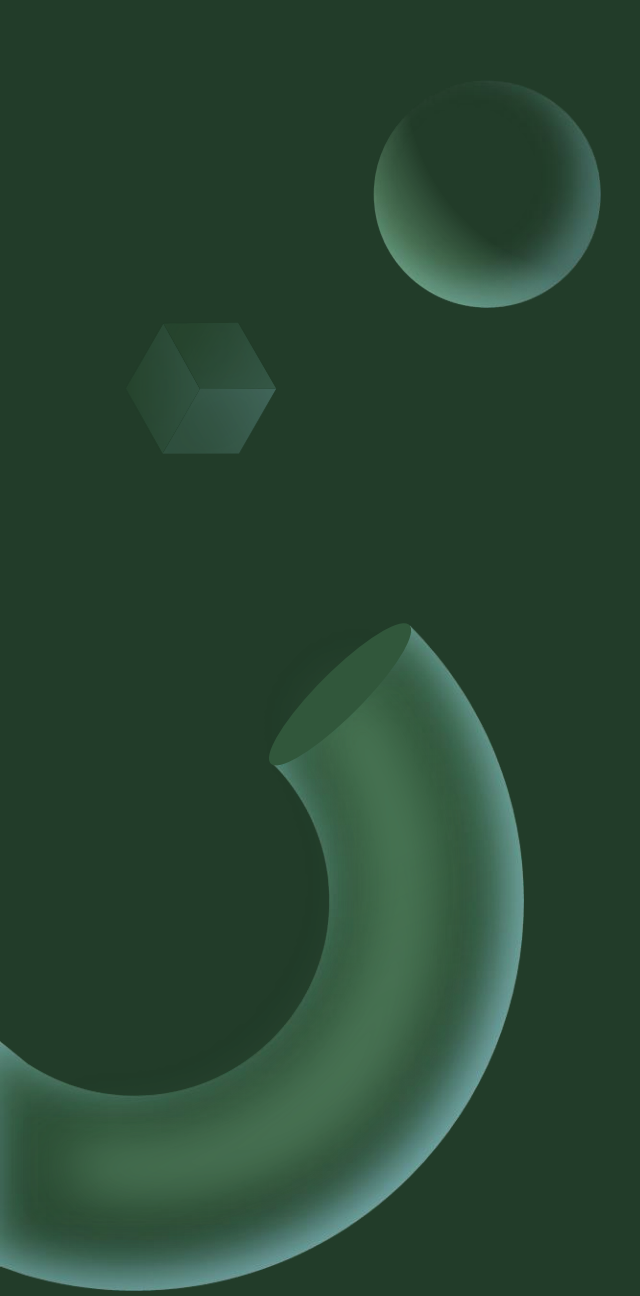
Challenges with water

1. Cauvery water is costly and should not be used for non potable usages due to compliance issues
2. Borewell water – Not dependable
3. Tanker Lorries – Costly (not advised)
4. STP water which is easily available (comes with some challenges)
5. Rain water (Not available round year, Bangalore don't have any more rain forests)



Abstract geometric shapes in a dark teal color: a sphere in the upper left, a cube below it, and a large torus (donut shape) on the left side of the frame.

What happens if we fill STP
water into water body today ?



Practically it is safe to use STP
water in water body, nothing will
happen. –But we have to take care
of few issues for long run

It Way Safer and better than Tanker Water

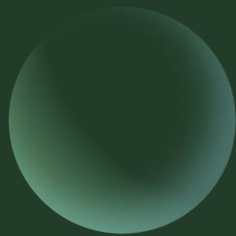


Challenges with STP water

	Challenges with STP	Comments from Residents
1	Blackish water in flushes	Residents do have a mental block towards using it.. Shhh... don't even go near STP water that is dirty... don't even talk to me about it.
2	Nitrates and phosphates	Presence of these will results in green algae growth in the water body which spoils the look and may damage the tiles.
3	Water from toilet sewage is treated and reused	How can we use such a water in our water body which is Spread across our campus, Can this can results in some kind of medical issue in the long run.
4	Can we really use STP for such purpose will the chemical present in STP water, spoil our water body ?	I really don't know... better we use BWSSB as it is 100% safe ... cant we use it even if it is costly ? (Comments I head heard from knowledgeable residents)

We have solutions

	Challenges with STP	Solution
1	Blackish water in flushes	Root cause identified and solved
2	Nitrates and phosphates	Quantity is so low when compared to limits, the small quantity which is present can easily be removed using chemical methods
3	Water from toilet sewage is treated and reused	Our water test reports indicates that the harmful microbes are way below the limits specified by WHO and Govt of India. In addition we can take added precautions. Bit of microbes are needed every where to strengthen our immunity.
4	Can we really use STP for such purpose will spoil our water body ?	Share the test report with residents. Also ensure we keep our final tank and pipes clean so that we always get crystal clear STP water, this will erase this feeling from the minds of old residents.



Lets explore the Solutions

What do we do for blackish water?

Root Cause

- During the 24 hours of sewage treatment. Some very few organic or inorganic particles escape from the reactor and makes it way out. Significant of them will be caught in settling tank, and rest in the two filtering units
- Still a very small amount of fine microscopic blackish (organic or inorganic) particles makes its way to the final tank and settle down.
- During pumping out process they make their way into pipes where they stick for a long time and comes out in our flushes as blackish water.
- The blackish water is caused by extremely fine particles which has escaped the treatment.

Solution for blackish water

	Solution	Status
1	Fix aerators (diffusers) in all the settling tanks and final tank	Fixed and functional
2	Periodic cleaning of final Tank	Schedule in place and followed
3	Periodic cleaning of STP water distribution pipes to remove blackish water particles that are sticking inside	Schedule in place and followed
4	More frequent cleaning (back wash) of filters	Schedule in place and followed
5	Checking the turbidity levels of STP water and taking actions	To be implemented
6	Keeping the final tank full most of the time so that the particles are always in the lower layers.	To be Implemented
7	Adding an additional filtration stage (pressure filter (Sand) before sending water to Water Body)	To be Implemented

Nitrates and Phosphates (Nutrients for Algae formation)

- These are the only two salts present in STP Water which makes it unsuitable for human consumption (differentiates it from fresh water)
- Water testing reports indicates that they are present only in very small quantities as our input is only residential sewage and 90% of it is just used fresh water from bathroom, kitchens.
- Out of which formation of algae is mostly caused by Phosphates. We can easily remove phosphates by adding small amounts metallic reagents (aluminium sulphate, sodium aluminate, ferric chloride, ferric sulphate, ferrous sulphate, and ferrous chloride.)
- This method is suited when phosphorus concentration is below one milli gram per Litre. Water test report of our STP water shows this parameter is way below this limit
- How much to metallic reagents to be added: Very little, Can be sprinkled or mixed with water and added into water body.

Further Steps to prevent algae formation

- Chlorination of water through chlorination unit. – This is mandatory to prevent any kind of algae or mosquito breeding. We already have this mechanism in place
- A sample of STP water kept openly in the sun, did not show any algae formation for two weeks. Slight formation of algae was observed after 14 days.
- Replacement of water in water body once a week is advised because of the above observation.
- Constant circulation and operation of fountains are advised to provide additional aeration.
- Frequent filtration during circulation & Chlorination will prevent any further algae which got introduced into the water during its exposure to nature. (Inoculum of algae can come through birds sipping water from water body, their beaks do carry many micro organisms)

Algae formation can happen even with Caverry water

Health /Medical issues with STP water.


- STP water is free of any kind of harmful chemicals, since the treatment is due purely using biological methods, only chemical used for it is Air bubbles.
- Nitrates and phosphates does not cause any health issues unless it is consumed, and their concentration is very less.
- Only factor in STP water that cause health issue is ColiForm a form of bacteria which is commonly found in animal/human faces. However this is present in very small quantities in River water and other natural water bodies. Human immune system is capable of killing this provided their concentration is really low. As per KSPCB the STP water is safe for non potable uses provided the ColiForm concertation is below 100 units per 100 ml of sample. In our Case this is less than one unit per 100 ml. Which is way below the limits set by KSPCB/WHO. Hence usage of STP water cannot cause any health issues or epidemics. This is a time tested fact.
- Additional Chlorination ensures bacteria growth is arrested in case the water gets contaminated by birds or other animals. (like rats/squirrels/bats etc).

Will STP water cause any kind of damage to water body ?


- It is very unlikely STP water can cause damage to water body or tiles. We have been using STP water for that last 12 years and none of the GI pipes which we use are corroded because of STP water.
- Since water body has white cement used in tiles, there is chance it can get corroded over time if STP water is acid
- For this purpose we track the pH level of STP water daily and it is always remain very close to 7 , which indicates it is neither acidic or alkaline to cause any kind of corrosion.



Paradigm shift



Let us not call it STP any more,
instead call it Water Recycling
Plant. Instead of STP water we
will say “Treated water” or
recycled water

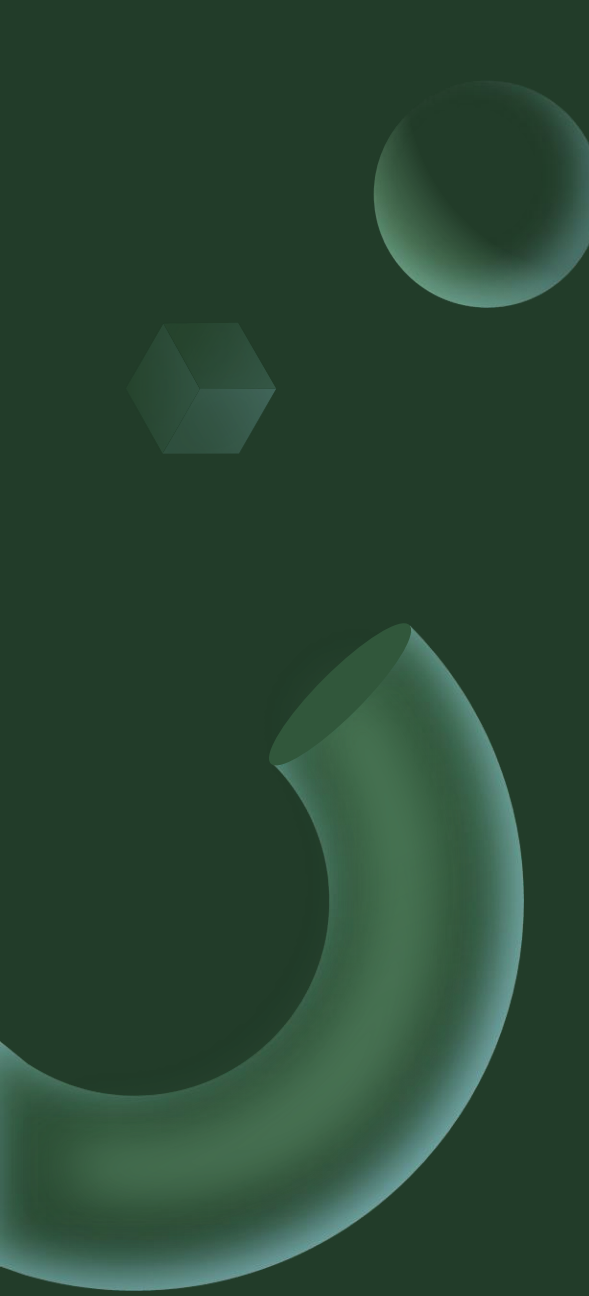




Implementation Plan
Expenses
Challenges

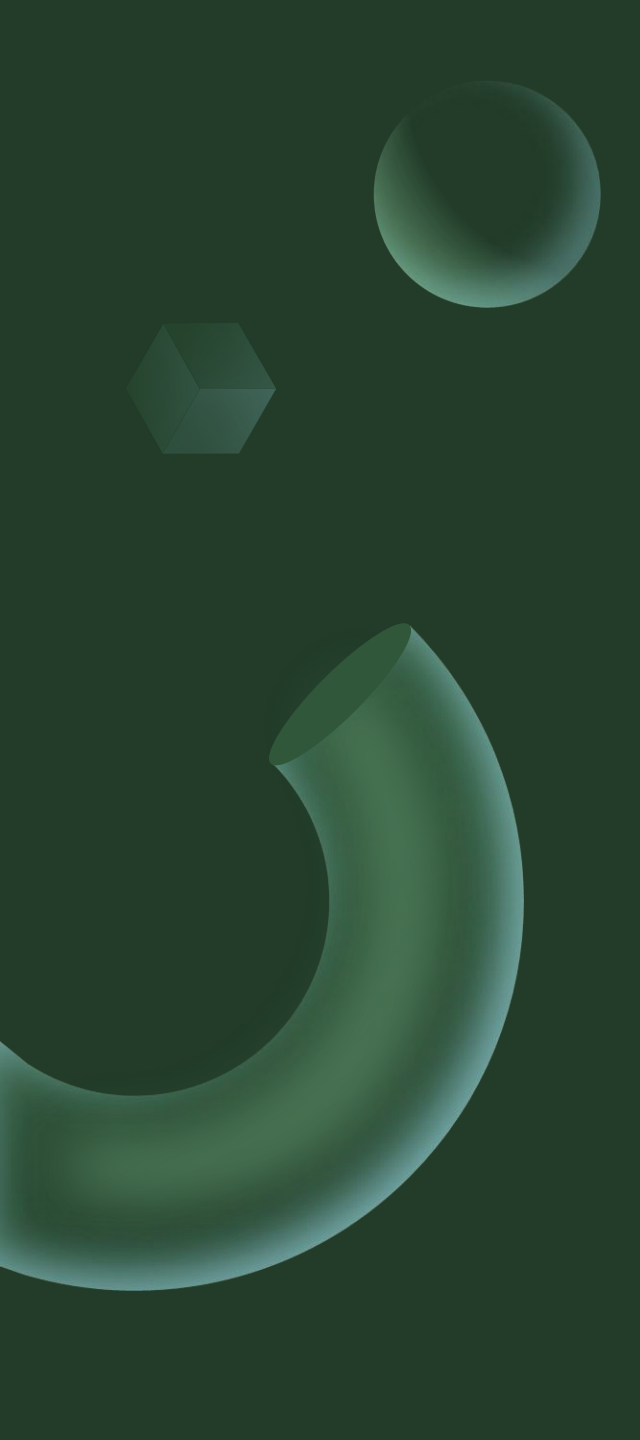
A dark teal background featuring three 3D geometric shapes. In the upper left, there is a sphere and a cube. In the lower left, there is a large torus (donut shape).

Phase One (Prototype)

A dark green background featuring three 3D geometric shapes on the left side: a sphere at the top, a cube in the middle, and a thick ring at the bottom. All shapes have a subtle gradient and soft shadows.

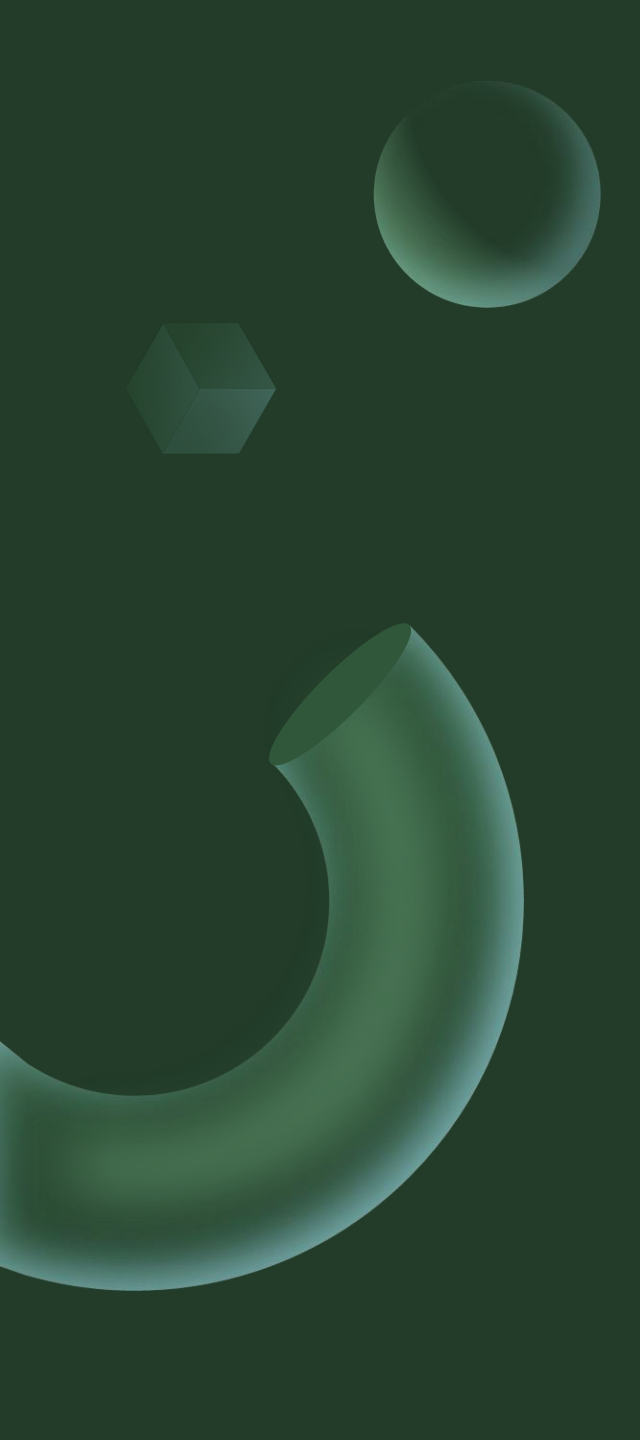
To start with we will identify a small independent portion of water body which has good exposure to sun light and wind.

(Club House area can be a candidate)



Fill in with STP water and deposit a fixed amount of metal reagent (Aluminum Sulphate) to prevent algae

We will NOT do filtering now, as we do not have provision for it today. Instead take STP water from the top, when the final tank is full.



Visually observe water and measure, the turbidity of water periodically using sensor or turbidity measuring jar.



1. Check for the formation of algae



2. Any other issues like black color deposits etc



3. Replace water every week.

4. Repeat this for four weeks

Observation Log Template

No	Date	Time	Algae found (Y/N)	Black Particles found (Y/N)	Odor (Y/N)	Turbidity (Actual values from sensor)	pH	Other Observation/ Comments
1								
2								
3								
4								
5								
6								
7								



Upon satisfactory completion of
Phase-I we can move to phase-2



Phase -2

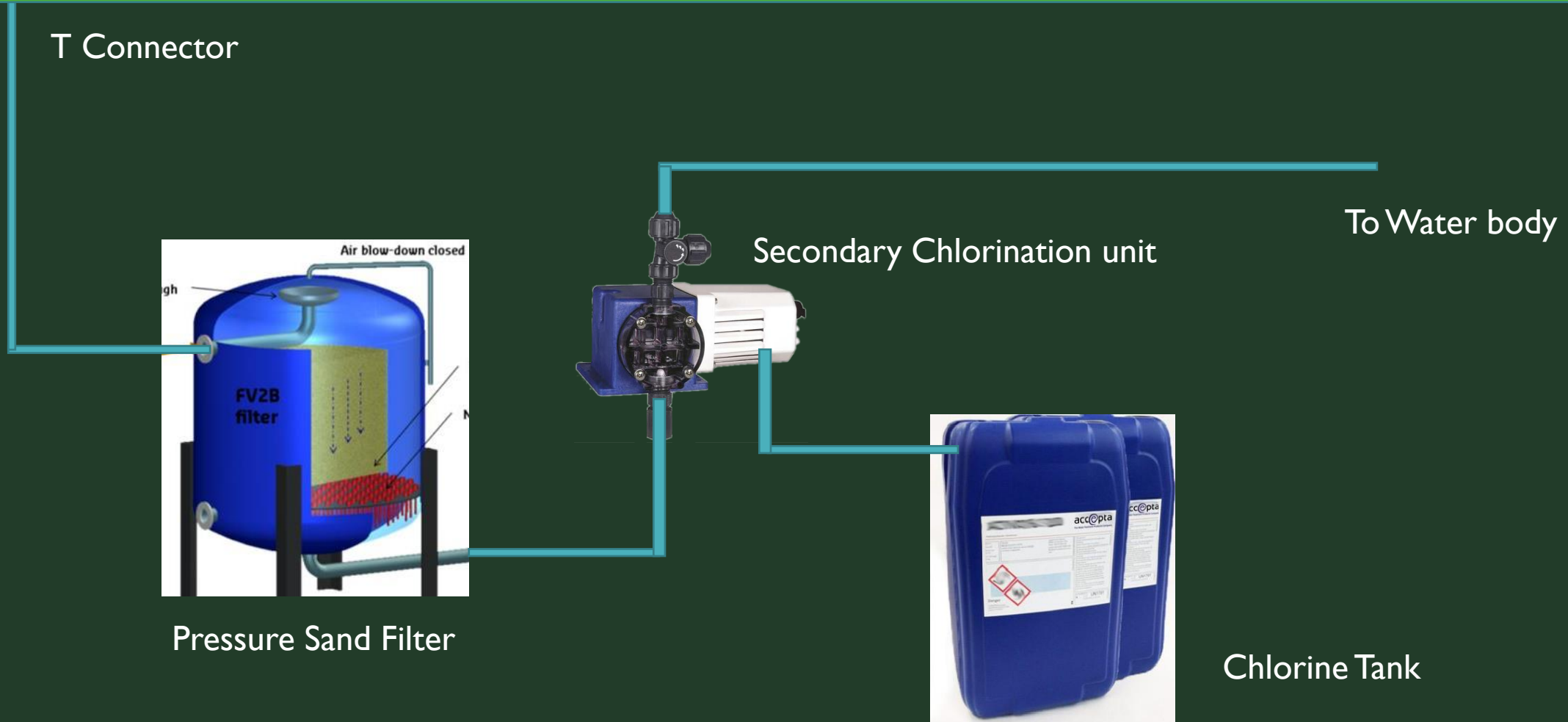
How much water we need

Calculations		
Total Length	250 meter	
Width	3 meters	
Height	50 cm	Current Water level
Cross section area	$3 \times 0.5 = 1.5$ sq meters	
Volume of water	$250 \times 1.5 = 375$ Cubic meters	
Volume in Liters	$375 \times 1000 = 3,75,000$ Liters	1000 liters makes on Cubic meter
True water holding capacity	Approx. 1.50,000 Liters	More that 50% is not used. It is not rectangle shaped.

We need a small water filtering unit that can filter 1.5 Lakhs liters in a day or two, so that water body can be filled within that time.

Implementation

Existing STP water Distribution line



Capital Investment

		Comments
Pressure Filter System		
Chlorine Pump		
Pipes		
Replumbing of Water body		
Installation Expenses & Labour		
Turbidity and pH Sensors		One set in Water body and another one in testing STP water samples.

Operational Overhead

Chlorine		
Aluminum Sulphate		
Back washing of filter		
Power for Running Pressure filter		
Maintenance of Pressure filter		