SUSTAINABLE SOLUTION FOR WASTEWATER MANAGEMENT IN DEVACHI URULI

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Abstract: *The goal of the project is to address the water issues in Devachi Uruli, a small Maharashtra hamlet close to Pune. Due to misuse and erratic rainfall, the hamlet has severe water shortages that impact daily activities, farming, and drinking water. In order to address this problem, we are planning and constructing a sewage treatment plant (STP), which will clean residential wastewater and produce potable water for use in homes and farms. The STP makes use of contemporary technologies, such as UV lights to eradicate any leftover bacteria, screens to eliminate large debris, bacteria to degrade dangerous materials, and filters to further purify the water. This guarantees the safe and clean treatment of the water. In addition, we intend to treat the residual sludge and convert it into beneficial goods like biogas and fertilizer. Our project is made to be both ecologically and energy-efficient. In order to guarantee the project's success and sustainability, we plan to involve the community and provide education. In addition to solving Devachi Uruli's immediate water problems, this initiative acts as a template for other rural areas dealing with comparable difficulties. It can have an impact on legislative changes and promote better water management techniques.*

Keywords: contemporary, degrade, legislative, misuse, potable, sludge, sustainability.

1. Introduction

Figure 1.1: "A Village Of Uruli Devachi"

There are serious water-related issues in Devachi Uruli, a rural Maharashtra community close to Pune. The hamlet used to have an abundance of water sources, but due to overuse and erratic rainfall, there are now shortages for drinking, farming, and daily necessities. This issue is made worse by improper wastewater management. Due to the village's reliance on antiquated techniques like open drains and septic tanks, which are unable to sufficiently manage wastewater, pollution and health problems for both locals and surrounding populations arise. For the inhabitants, especially the farmers who depend on clean water for their crops, the lack of it presents serious difficulties. Furthermore, the pollution of current water sources makes daily living even more difficult and endangers everyone's health. Our project intends to implement sustainable wastewater management solutions in Devachi Uruli in recognition of these challenges.We aim to ensure access to healthier water and reduce water pollution by building a state-of-the-art sewage treatment plant and involving the local community.

The idea that everyone deserves access to clean water and a healthy environment is what motivates our endeavor. We not only improve living circumstances in Devachi Uruli but also help to preserve the environment for future generations by implementing better wastewater management procedures. Our goal is to provide workable, efficient solutions that will benefit every villager and advance sustainability in rural areas.

Our motivation for working on this project is to provide assistance to the residents of Devachi Uruli and nearby communities. A healthy environment and clean water should be available to all. We can improve the quality of life for the residents of Devachi Uruli and save the environment for future generations by figuring out better ways to handle wastewater. Finding solutions that are easy to use, efficient, and beneficial to all parties is the main goal of our project.

Figure 1.2: "Devachi Uruli Villagers' Struggle for Water"

In Devachi Uruli, we observed a significant problem with water scarcity (as shown in fig.1.2), which severely affects the community. To address this, my team and I decided to focus on recycling wastewater from households. We proposed the design of a sewage treatment plant (STP) that would treat the wastewater and convert it into clean water. This treated water can then be used for agricultural purposes and domestic needs. By implementing the STP, we aim to provide a sustainable solution to the water shortage, ensuring that the village can make the most of its available water resources. This project not only addresses the immediate water issues but also promotes long-term environmental sustainability in Devachi Uruli.

Designing a sewage treatment plant (STP) is our project for Devachi Uruli, which aims to solve the village's wastewater problems. To guarantee that the STP runs effectively without endangering the environment, we have used cutting-edge technology and clever engineering. The STP is made up of a number of parts that combine to completely purify the wastewater. Screens will initially capture larger material, such as sticks and plastic. Subsequently, dangerous materials in the water, such chemicals and pathogens, will be broken down by certain bacteria. Because of these microorganisms, the water is safer. The water next goes through filters to get rid of more debris and small particles. To make sure the water is pure before it is discharged back into the environment, we also utilize ultraviolet rays to eradicate any bacteria that may still be present. We have also thought about what to do with the sludge that is created throughout the treatment procedure.

To ensure that nothing is wasted, this sludge can be transformed into beneficial items like biogas for cooking or fertilizer for agriculture. We have put in place a thorough plan to handle the sludge generated throughout the treatment process. Nothing goes to waste because this sludge may be recycled into biogas for cooking or fertilizer for crops. Our STP makes use of the most advanced technologies available to provide an ecologically responsible and energy-efficient design.

The objectives of this project are to save the environment, enhance public health, and supply clean water to Devachi Uruli. We are guaranteeing a sustainable and better future for the entire village by putting this carefully thought-out STP into action, in addition to resolving the wastewater issues of the present.

1.1 Problem Statement:

Devachi Uruli's inadequate wastewater management and extreme water scarcity cause environmental and health issues. Our project's goal is to create a sewage treatment facility that will solve these problems and raise the village's standard of living. Our project's goal is to construct a sewage treatment plant in Devachi Uruli that will process wastewater and supply the hamlet with safe, reusable water.

1.2 Aim

The aim is to plan and construct a sewage treatment facility in Devachi Uruli. to enhance the quality of water sources and lessen pollution in the water. to promote agricultural practices and improve public health by supplying reusable, clean water.

1.3 Objectives

- To design and establish a sewage treatment plant in Devachi Uruli.
- To reduce water pollution and improve the quality of water sources.
- To enhance public health and support agricultural activities by providing clean, reusable water.

1.4 Project Purpose

- Improve water quality by treating wastewater.
- Enhance public health by reducing water pollution.
- Support agriculture with access to clean water.
- Protect the environment by minimizing pollution.
- Set an example for sustainable development in rural areas.

2. Related Work

Water scarcity and wastewater management in rural communities have been the focus of numerous global initiatives, which have given us important insights for our project in Devachi Uruli. Decentralized sewage treatment systems, like those implemented in rural India under the Nirmal Bharat Abhiyan (formerly known as the Total Sanitation Campaign), which aimed to build individual household toilets and communal sanitation facilities, are one prominent example. Furthermore, initiatives like Gujarat's Bhungroo system, which collects rainfall and replenishes groundwater to lessen water scarcity in farming areas, have shown creative methods to water management.

Globally, the Water for People organization has conducted community-driven initiatives in rural developing nations to improve access to water and sanitation, with a focus on community empowerment and sustainable solutions. Similar to this, organizations like UNICEF and Water.org's Water, Sanitation and cleanliness (WASH) programs have offered extensive assistance for the building of water infrastructure and the promotion of cleanliness in rural areas across the globe. These programs highlight how crucial it is to handle water issues in rural areas through community involvement, technological innovation, and sustainability. Based on the insights gained and optimal methodologies recognized in these associated studies, our initiative in Devachi Uruli seeks to customize a solution that is appropriate for the local context, long-lasting, and expandable, providing significant advancements in the field of rural water management.

3. Methodology

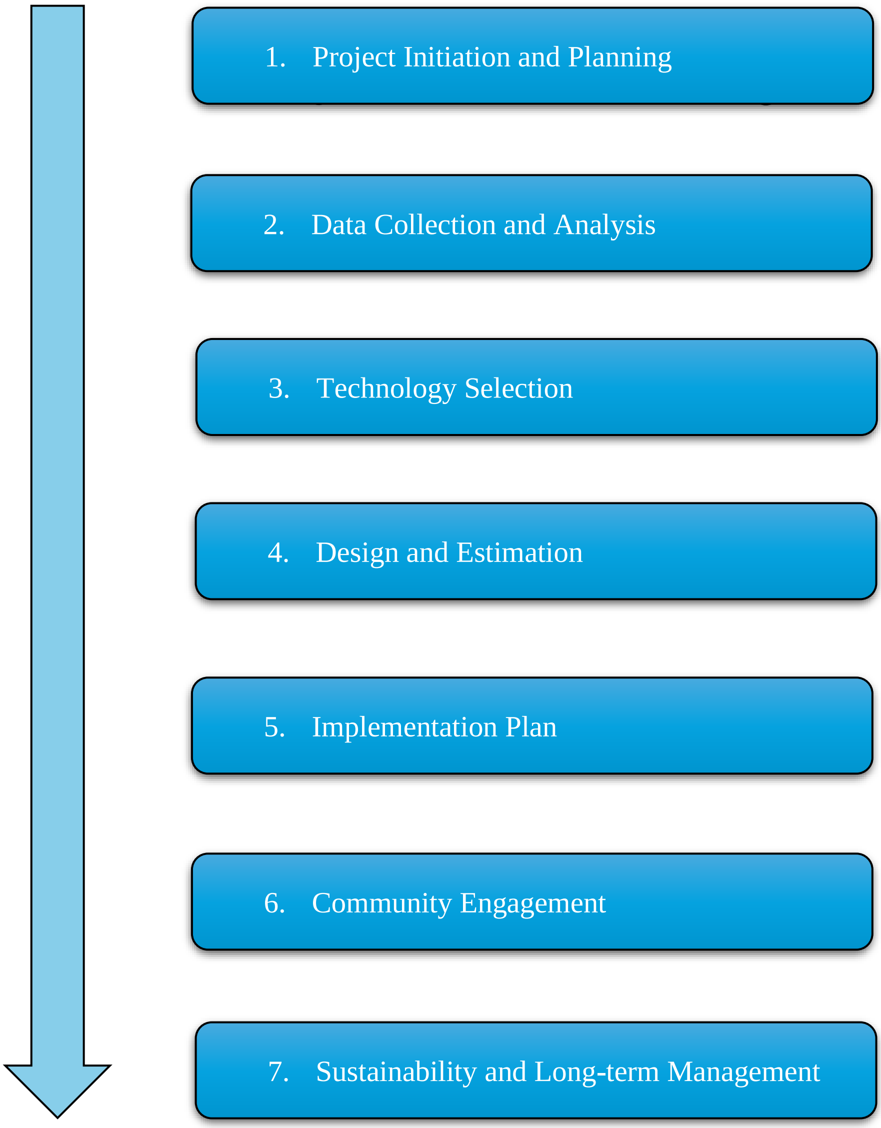


Figure 3. 1: Methodology of Project

3.1. Introduction

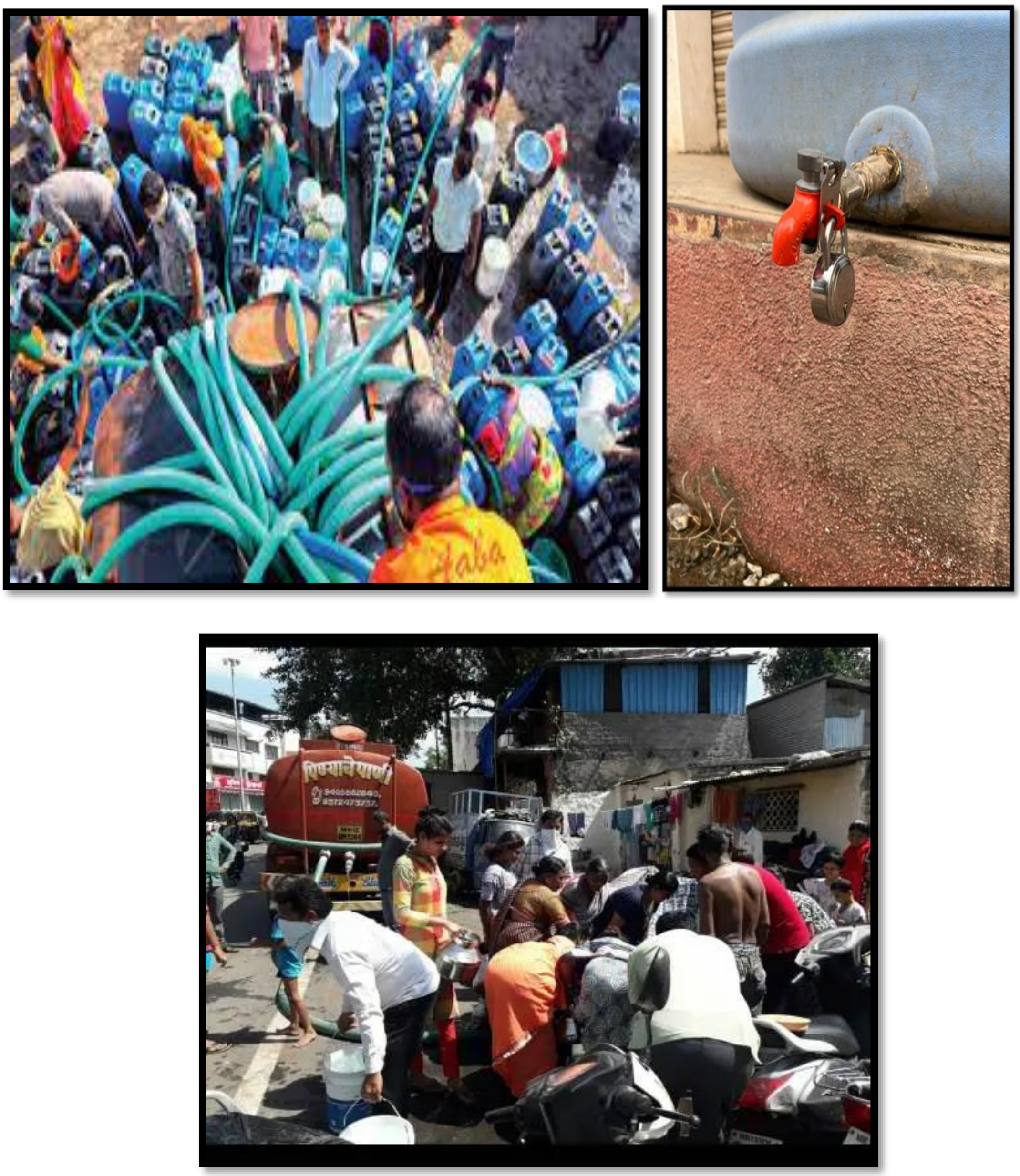


Figure 3.2: Residents of Uruli Devachi face severe water shortage

Devachi Uruli faces a serious problem with water scarcity, which is mostly brought on by excessive groundwater exploitation and erratic rainfall. The supply of drinking water, agricultural output, and daily activities of the locals are all impacted by this scarcity. It is essential to comprehend the causes and effects of water scarcity in order to create workable remedies. Lower water tables brought on by the depletion of groundwater supplies make it more difficult to obtain water for a variety of purposes. Variable rainfall patterns aggravate the issue even further, making the neighborhood susceptible to water scarcity. Household wastewater is contaminated with a variety of substances, such as bacteria, chemicals, and organic materials. Insufficient wastewater management in Devachi Uruli has resulted in soil and water body pollution, endangering public health and damaging the ecosystem.

The comprehension of these pollutants and the procedures necessary for their efficient removal forms the theoretical foundation for wastewater treatment. Both public health and environmental degradation can be avoided with proper treatment.

Sewage treatment's main objective is to rid wastewater of impurities so that it's safe to reuse or release back into the environment. Generally speaking, the therapy procedure combines chemical, biological, and physical techniques. Chemical procedures include disinfection to eliminate dangerous bacteria, biological methods use microorganisms to break down organic debris, and physical methods entail screening and sedimentation.

3.2 SEWAGE TREATMENT PLANT

3.2.1. Overview:

Prior to being released back into the environment, wastewater must be cleaned and purified in sewage treatment plants (STPs). They are essential in making sure that the water that is discharged from residences, companies, and factories is safe and doesn't damage the environment or the general public's health. STPs purge wastewater of impurities like bacteria, viruses, chemicals, and solid particles using a mix of physical, biological, and chemical processes. By treating sewage effectively, STPs help reduce water pollution, conserve natural ecosystems, and promote public health. These infrastructures are necessary to sustain supplies of clean water and promote sustainable development in global communities.

3.2.2. Objectives of STP:

- To the purpose of sewage treatment is to separate solid trash from wastewater by using physical techniques like sedimentation and screening.
- To use biological processes to lower the amount of organic matter in wastewater.
- To remove dangerous organisms from wastewater, such as viruses and bacteria.
- To raise the wastewater's quality to a level that complies with discharge requirements.
- To safeguard public health by halting the transmission of diseases that are water-borne.
- To reduce the negative effects of wastewater discharge on the environment.
- To enable the repurposing of wastewater for uses other than drinking, including gardening.
- To guarantee adherence to standards and regulatory requirements.
- To encourage sustainable development objectives in areas where wastewater infrastructure is present.
- To prevent ecological impact to land habitats and water bodies by processing wastewater to eliminate pollutants and increase environmental sustainability

3.3. Component Parts of Sewage Treatment Plant

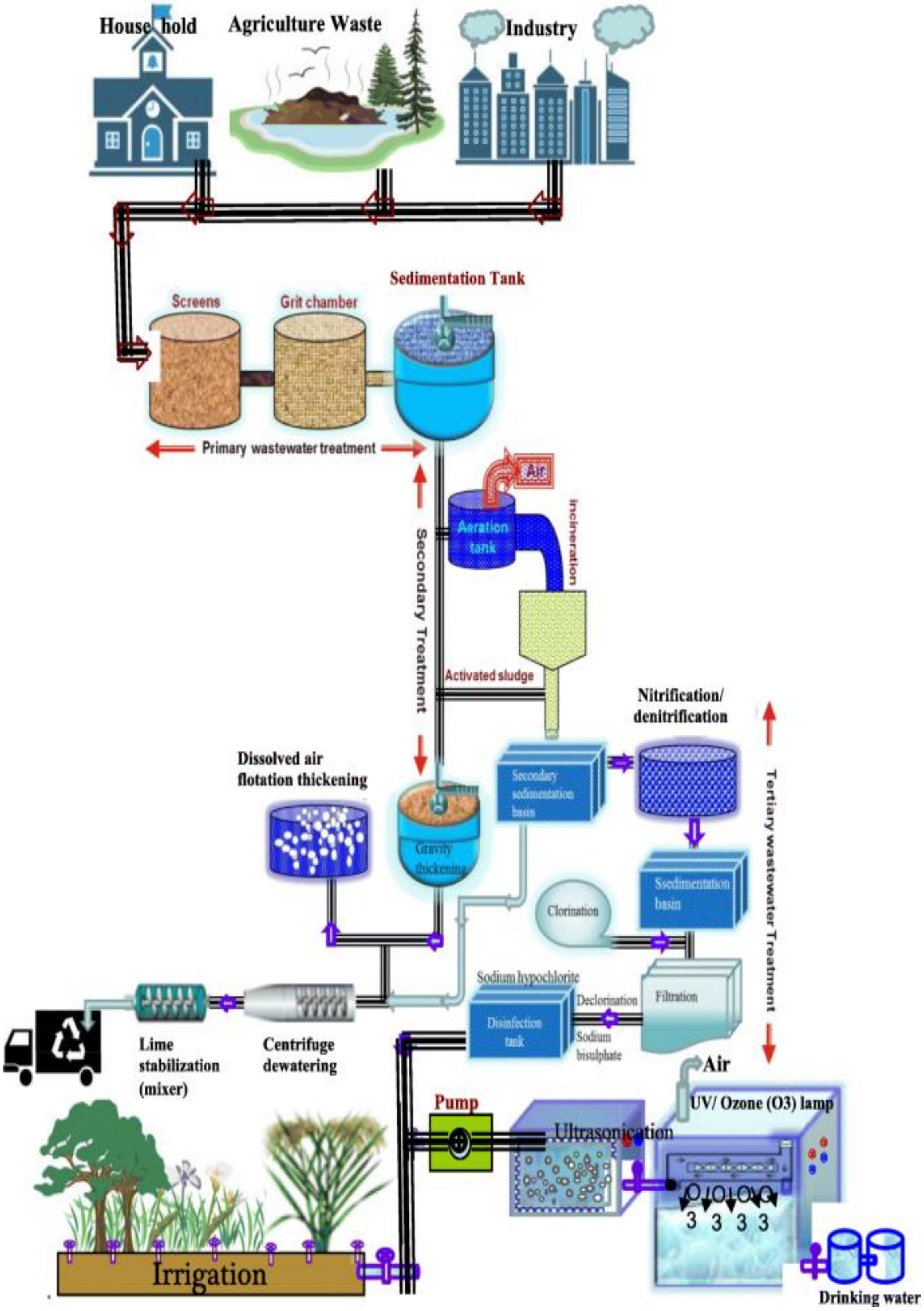


Figure 3.3: "Detailed process Of STP"

3.3.1. Primary Treatment :

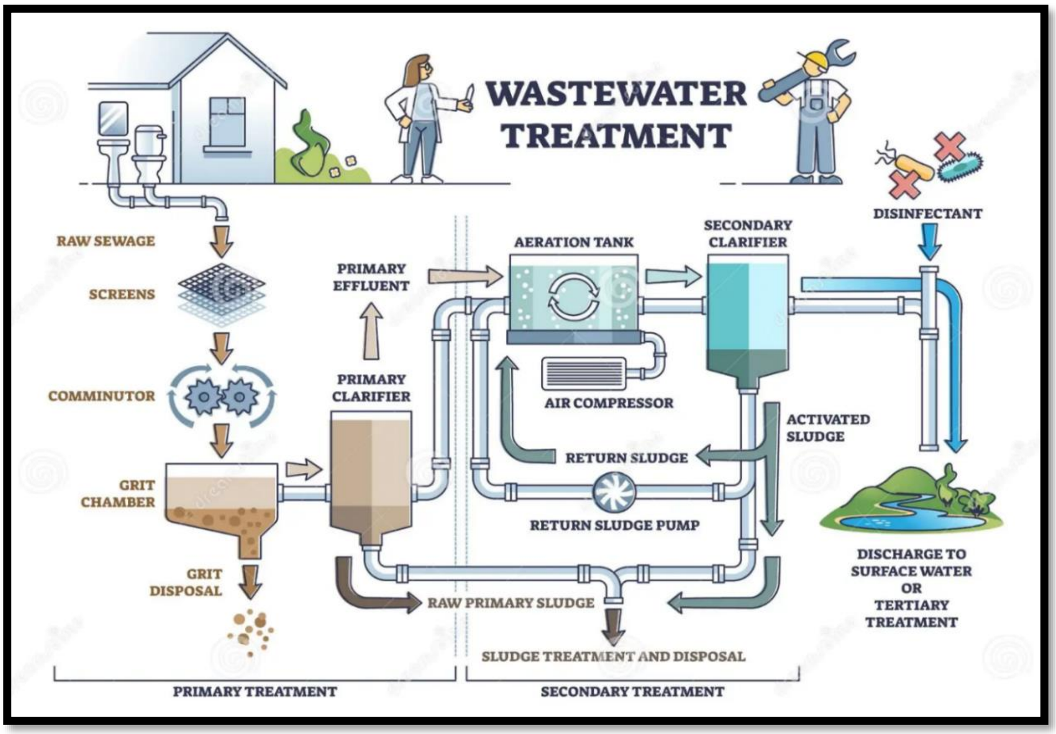


Figure 3.4: "Flow Chart Of STP"

Primary treatment uses physical procedures like screening, comminution, grit removal, and sedimentation to remove items that float or settle due to gravity. Screens prevent blockages by blocking big materials like wood and rags with closely spaced metal bars. Screens in modern plants are mechanically cleaned, and debris is disposed of locally. Screen-moving debris is ground by comminutors, and the shredded material is then recovered by flotation or sedimentation.

The Preliminary & Primary Treatment Of Sewage Consist Of Various Units:

- Pumping
- Screening
- Grit Chamber
- Primary Sedimentation

3.3.2. Secondary Treatment:

Soluble organic matter and extra suspended particles that evade basic treatment are eliminated by secondary treatment. Biological processes are usually used in this process, in which organic pollutants are consumed by bacteria and transformed into energy, water, and carbon dioxide. The sewage treatment facility, which offers the ideal environment for these activities, facilitates this biological activity. At this point, eliminating soluble organic debris protects aquatic ecosystems by assisting in the maintenance of the dissolved oxygen balance in rivers, streams, or lakes.

The three main biological treatment techniques are oxidation ponds, activated sludge processes, and trickling filters. A less popular approach is the biological contactor that rotates. Secondary treatment aims to eliminate any remaining organic materials and suspended particles from the original treatment effluent.

The Secondary Treatment Of Sewage Consist Of Various Units:

- Aeration Tank
- Secondary Clarifier
- Biofilm Reactors
- Trickling Filter
- Activated Sludge Treatment System
- Oxidation Ponds

3.3.3. Tertiary Treatment:

Introduction: The last phase of wastewater treatment, known as tertiary treatment, offers further purification above and beyond secondary treatment and is frequently required to satisfy strict water quality criteria. After primary and secondary treatment, tertiary treatment is the last phase of traditional wastewater management. Its goal is to further refine the effluent by eliminating nutrients and other contaminants to fulfill discharge or reuse regulations. Wastewater is prepared for final use in the tertiary treatment stage of a wastewater management system. Depending on the wastewater's source and intended purpose, different levels of treatment are required.

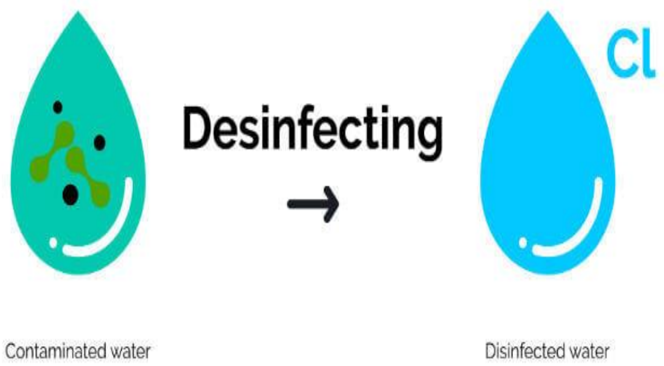


Figure 3.5: "Process of Tertiary treatment"

The main objective is to remove organic debris, pathogens, nutrients, and suspended solids from secondary effluent in order to make sure that the treated water is safe to reuse or discharge into receiving waters that are sensitive.

The Tertiary Treatment of Sewage Consist Of Various Units:

- Chemical dosing units
- Filtration systems
- Disinfection chambers
- Effluent polishing units
- Nutrient removal systems
- Land treatment facilities
- Clustered wastewater treatment systems
- On-site septic tanks and leaching fields
- Wastewater reuse systems

3.3.4. Sludge Treatment And Disposal:

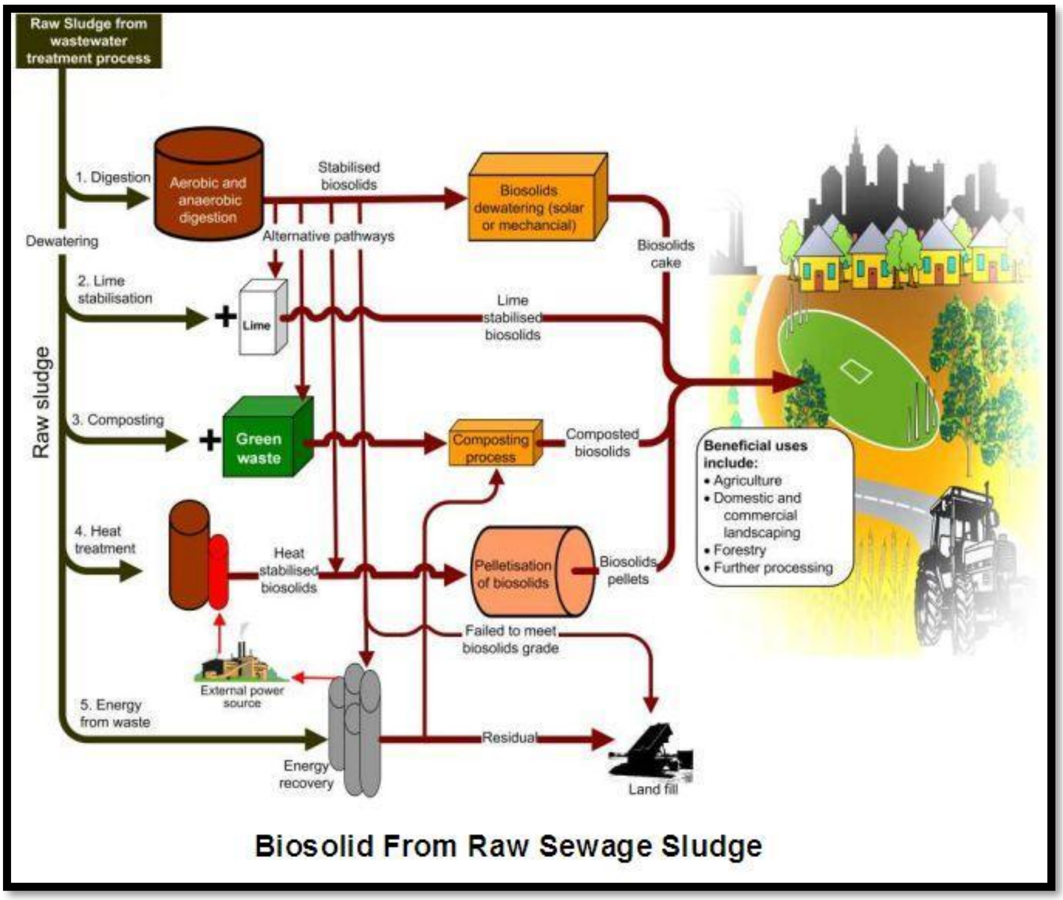


Figure 3.6: "Process of Sludge Treatment And Disposal"

The substance left over after wastewater is treated in sewage treatment plants is called sewage sludge, or biosolids. It is made up of two types of sludge: secondary sludge that is created by biological treatments and primary sludge that is the product of chemical precipitation and sedimentation. Optimizing wastewater treatment facilities' operations and environmental impact requires efficient sludge treatment and disposal.

Sludge treatment and disposal are primarily done to control and reduce the amount of sludge generated, stabilize organic materials, get rid of pathogens, and lessen any potential odors or health risks that come with untreated sludge. Furthermore, appropriate sludge management seeks to promote safe and ecologically responsible disposal techniques as well as the recovery of resources like electricity.

Unit:

Depending on the size of the treatment plant and the amount of sludge produced, the unit of measurement for sewage sludge volume is usually expressed in metric units, such as cubic meters (m^3) or liters (L). Furthermore, the percentage (%) of sludge moisture content can be used to evaluate the effectiveness of dewatering and the need for transportation.

Measurements of the sludge volume (e.g., cubic meters), solids content (e.g., percentage dry solids), and efficiency metrics (e.g., removal efficiency percentages) are among the units used in sludge treatment and disposal.

3.4 FOR DESIGN OF SEWAGE TREATMENT PLANT

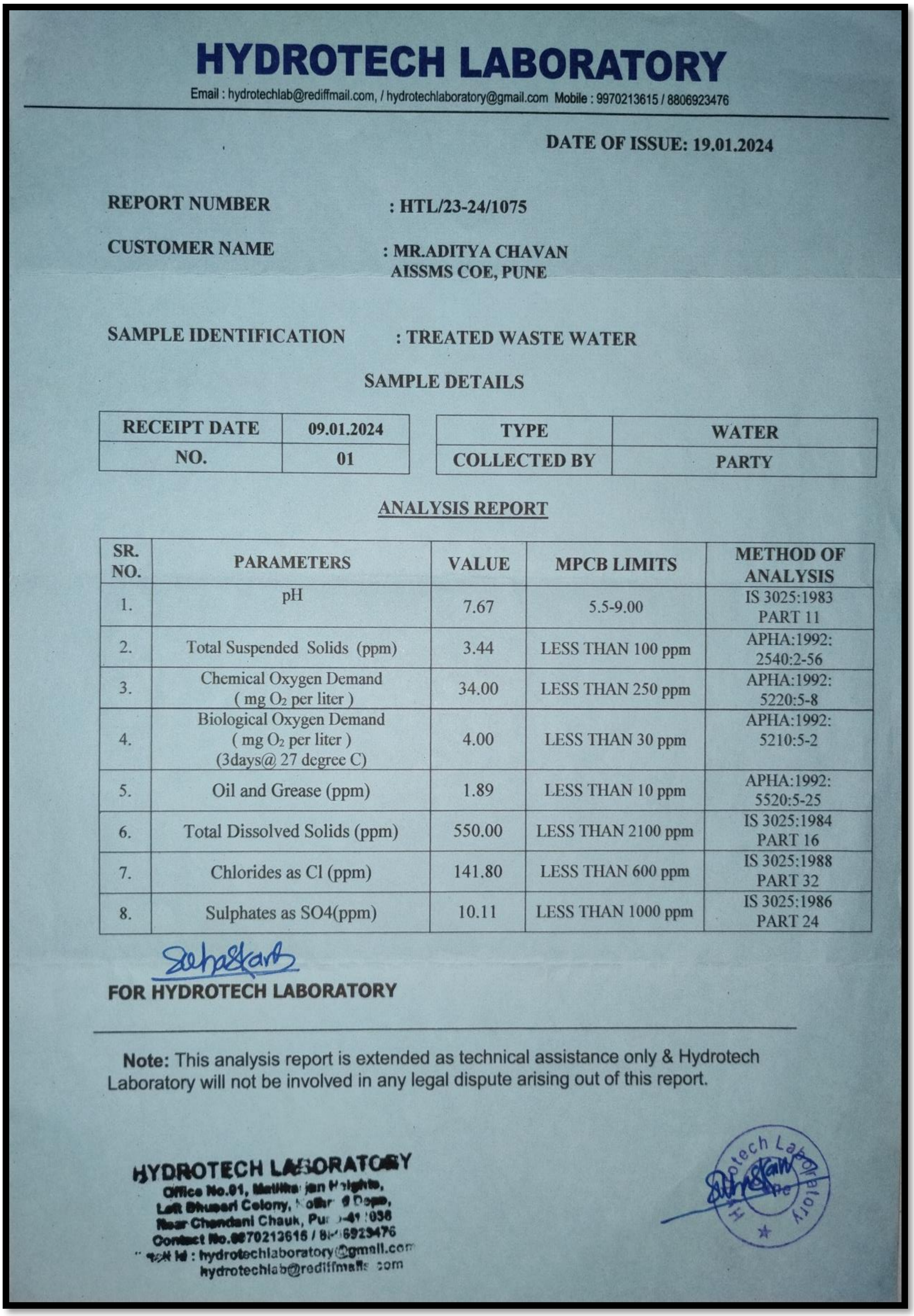
Following our visit to Devachi Uruli, we inspected the sewage and water outlets. Engaging with the locals, we inquired about the primary issues, and they highlighted water scarcity as the major concern in the village.

Figure 3.7: Visit to Devachi Uruli Engaging with the locals

For the Design of a sewage treatment plant, collecting a sewage sample from the village, we planned to submit it for lab testing.

Figure 3.8: Collecting the water sample for water testing

After collecting water samples, we submitted them to the laboratory for testing, both for treated and untreated water. Below are the reports indicating the results of the tests conducted.



HYDROTECH LABORATORY

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DATE OF ISSUE: 19.01.2024

REPORT NUMBER : HTL/23-24/1075

CUSTOMER NAME : MR.ADITYA CHAVAN
AISSMS COE, PUNE

SAMPLE IDENTIFICATION : TREATED WASTE WATER

SAMPLE DETAILS

RECEIPT DATE	09.01.2024
NO.	01

TYPE	WATER
COLLECTED BY	PARTY

ANALYSIS REPORT

SR. NO.	PARAMETERS	VALUE	MPCB LIMITS	METHOD OF ANALYSIS
1.	pH	7.67	5.5-9.00	IS 3025:1983 PART 11
2.	Total Suspended Solids (ppm)	3.44	LESS THAN 100 ppm	APHA:1992: 2540:2-56
3.	Chemical Oxygen Demand (mg O_2 per liter)	34.00	LESS THAN 250 ppm	APHA:1992: 5220:5-8
4.	Biological Oxygen Demand (mg O_2 per liter) (3days@ 27 degree C)	4.00	LESS THAN 30 ppm	APHA:1992: 5210:5-2
5.	Oil and Grease (ppm)	1.89	LESS THAN 10 ppm	APHA:1992: 5520:5-25
6.	Total Dissolved Solids (ppm)	550.00	LESS THAN 2100 ppm	IS 3025:1984 PART 16
7.	Chlorides as Cl (ppm)	141.80	LESS THAN 600 ppm	IS 3025:1988 PART 32
8.	Sulphates as SO4(ppm)	10.11	LESS THAN 1000 ppm	IS 3025:1986 PART 24

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Note: This analysis report is extended as technical assistance only & Hydrotech Laboratory will not be involved in any legal dispute arising out of this report.

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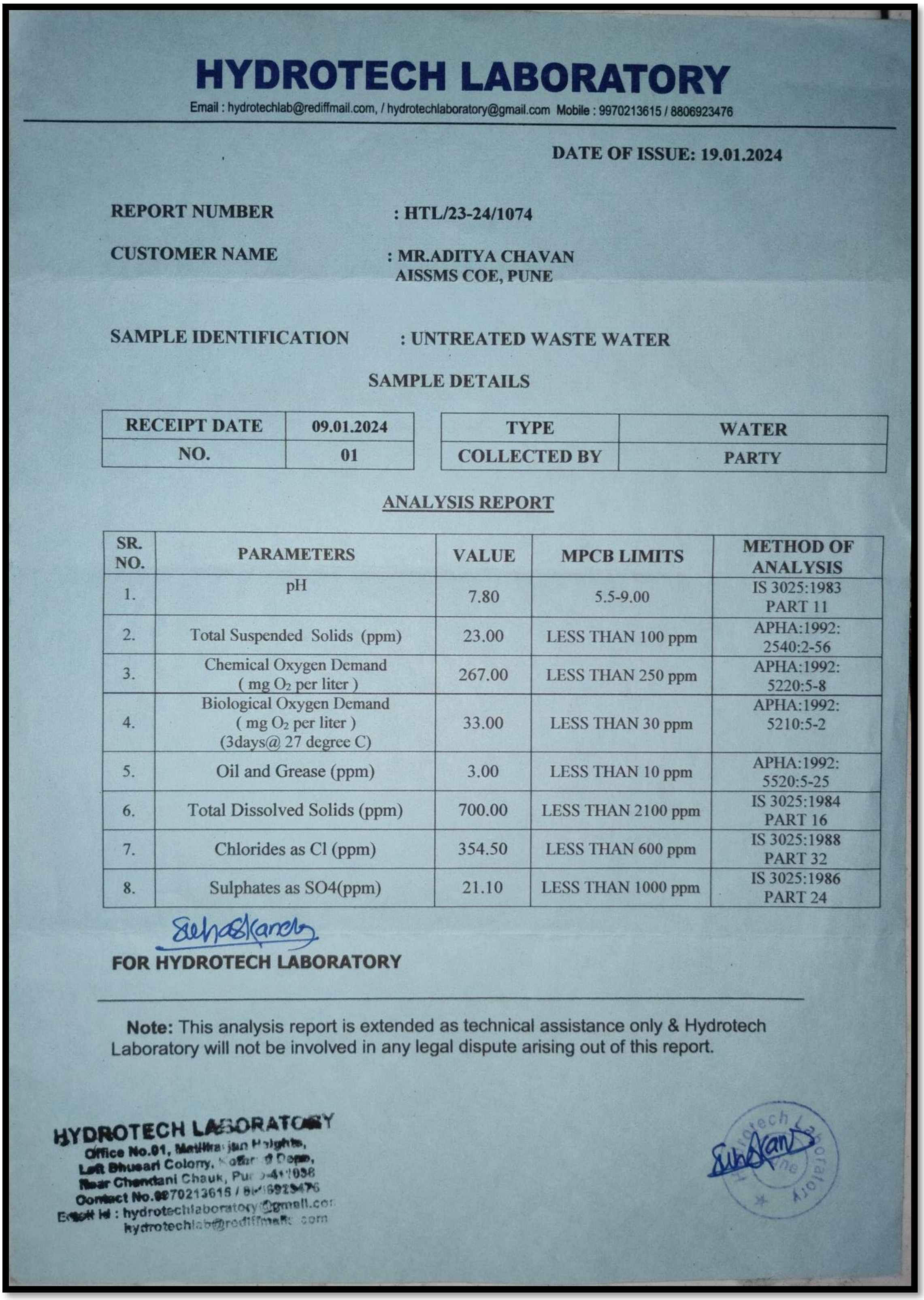
Figure 3.9: "The laboratory testing report of treated water."



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DATE OF ISSUE: 19.01.2024

REPORT NUMBER : HTL/23-24/1074

CUSTOMER NAME : MR.ADITYA CHAVAN
AISSMS COE, PUNE

SAMPLE IDENTIFICATION : UNTREATED WASTE WATER

SAMPLE DETAILS

RECEIPT DATE	09.01.2024	TYPE	WATER
NO.	01	COLLECTED BY	PARTY

ANALYSIS REPORT

SR. NO.	PARAMETERS	VALUE	MPCB LIMITS	METHOD OF ANALYSIS
1.	pH	7.80	5.5-9.00	IS 3025:1983 PART 11
2.	Total Suspended Solids (ppm)	23.00	LESS THAN 100 ppm	APHA:1992: 2540:2-56
3.	Chemical Oxygen Demand (mg O_2 per liter)	267.00	LESS THAN 250 ppm	APHA:1992: 5220:5-8
4.	Biological Oxygen Demand (mg O_2 per liter) (3days@ 27 degree C)	33.00	LESS THAN 30 ppm	APHA:1992: 5210:5-2
5.	Oil and Grease (ppm)	3.00	LESS THAN 10 ppm	APHA:1992: 5520:5-25
6.	Total Dissolved Solids (ppm)	700.00	LESS THAN 2100 ppm	IS 3025:1984 PART 16
7.	Chlorides as Cl (ppm)	354.50	LESS THAN 600 ppm	IS 3025:1988 PART 32
8.	Sulphates as SO4(ppm)	21.10	LESS THAN 1000 ppm	IS 3025:1986 PART 24

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Hydrotech Laboratory

Figure 3.10: "The laboratory testing report of Untreated water."

3.4.1. DOMESTIC SEWAGE FLOW RATE:

Using a design flow factor and an average water usage per capita, we will calculate the domestic sewage flow rate in million liters per day (MLD) for a 27,000-person rural region.

The design flow factor takes into account variables including the kind of place (rural or urban), climate, and cultural customs to account for changes in water usage patterns. Because rural areas use less water than metropolitan areas do, their design flow factors are usually smaller.

Using a population of 27,000, we will compute the residential sewage flow rate in Million Liters per Day (MLD) using the following formula:

formula :

Population × Water Use per Capita × Design Flow Factor = Sewage Flow Rate (MLD)

Water Usage per Capita (WUC):

A number of variables, including lifestyle, climate, and cultural customs, affect how much water is used per person. A rural area's minimum Water Usage per Capita (WUC) value can be estimated to be between 50 and 100 LPCD.

Design Flow Factor (DFF):

Depending on variables including water availability, conservation methods, and usage patterns, the design flow factor for rural areas usually ranges from 0.6 to 1.2.

- To account for lower water usage in a rural location, we can use a cautious estimate of 0.6.
- People (P): Assumed: 27,000 people live there.
- Design Flow Factor (DFF) in a rural environment is equal to 0.6.
- 50–100 LPCD is the water usage per capita (WUC).

Use the following formula to get the domestic sewage flow in MLD:

Domestic Sewage Flow (MLD) = Population × Water

WUC (50 LPCD) minimum estimate:

Domestic Sewage Flow (MLD)

= 27,000×50×0.61000 / 10^6

= **Min. 0.81 MLD** is the domestic sewage flow (MLD).

The maximum estimate of WUC (100 LPCD):

Domestic Sewage Flow (MLD)

= 27,000×100×0.61000 / 10^6

= **Max. 1.62 MLD** is the domestic sewage flow (MLD).

Therefore, depending on the water usage per capita (ranging from 50 LPCD to 100 LPCD), the residential sewage flow for a population of 27,000 in a rural location can vary from roughly 0.81 MLD to 1.62 MLD.

4. Results

4.1. Dimensions of the each unit for construction of STP :

4.1.1. Screen Chamber:

- Population of the Screen Chamber: 27,000
- Flow Rate (Q): 1.35 m^3/s (50 MLD)
- The flow depth before the screen 1.2 meters
- The bar's width is 10 mm (0.01 meters).
- Clear Distance Between Bars: 0.025 meters, or 25 mm
- Bar Forming Ratio (β): 2.42 75° is the angle of inclination (φ).
- The C.O.A. (clear opening area through bar) is 1.5882 m^2.
- The opening's clear width (C.W.O.) is 1.3235 meters.
- There are 52 spacings.
- There are 51 bars.
- Screen Chamber Width Overall: 1.87 meters
- 0.865 m/s is the flow velocity through the opening (V).
- Flow velocity (v) prior to the screen: 0.60 m/s
- Loss of Head: 0.0256 meters

4.1.2. Grit Chamber:

- Population: 27,00 People
- Usage of Water: 50 LPCD
- Sewage volume on average: 0.0125 m^3/sec
- Flow Maximum: 0.03125 m^3/sec
- 0.2 m/sec is the horizontal velocity (V_h).
- 60 seconds was the detention time.
- Measurement in length: 12 meters
- Volume is the 1.875 m^3
- Area of Cross-Section (A): 0.1563 m^2
- Breadth: one meter
- 0.1563 meters at depth
- An extra five meters are the length of the inlet and outlet zones.
- Measurement of Free Board: 0.3 meters
- Depth of the Grit Accumulation Zone: 0.25 meters
- Depth overall: 0.7063 meters

4.1.3. Primary Sedimentation Tank:

- Population of Primary Sedimentation Tank (PST): 27,000
- 50 LPCD of wastewater generated daily; 1.35 * 10^6 liters
- 112.5 m^3 is the capacity.
- Depth of Effect: 2.5 meters
- 45 m^2 of surface area
- Breadth (B): 4 meters
- Length (L): 16 meters
- 20 meters in total length
- Depth of Sludge Accumulation: 1 m
- Depth of Free Board: 0.5 m
- Depth Overall: 4 m
- Rate of Overflow: 73.24 liters per hour/m^2 Yes, standby unit
- Overall measurements: 20 m in length, 4 m in width, and 4 m in depth.

4.1.4. Aeration Tanks:

- Population of Aeration Tanks: 27,000
- 50 LPCD is the flow rate.
- Flow total: 1.35 * 10^6 liters per day
- BOD Load: Determined by using the influent BOD concentration.
- Essential Action to Take: to be kept up to date with design specifications
- 3000 mg/L is the design MLSS
- F/M Ratio: 0.2 (use example value; modify according to design)
- Detention Duration: To be established by design computations
- Volume: To be computed using the detention time and flow rate
- Dimensions: To be decided upon taking volume and layout into account.
- Aeration Method: Mechanical or diffused (indicate according to design)

4.1.5. Secondary Settling Tank:

- Design Diameter of Secondary Settling Tank: 8 meters
- Depth of Effect: 3.5 meters
- Depth Overall: 4.5 m
- 45 m^2 of surface area
- 157.5 m^3 is the volume
- 2.5 hours of detention

4.1.6. Chlorination:

- Population Chlorination: 27,000
- The flow rate per day is 1.35 * 10^6 liters/day, or 1.35 MLD.
- The amount of chlorine to be used will depend on the effluent quality criteria, which are usually expressed in mg/L or ppm.
- Chlorine Contact Time: To be established in accordance with effluent characteristics and disinfection requirements.

4.1.7. Sludge Treatment:

- Step 1: in Sludge Treatment: Sludge Production: Assume 0.5 kg of sludge for every kilogram of BOD eliminated; hence, 0.5 x 324 = 162 kg/day of sludgeMud = 0.5 × 324 = 162 kg/day
- Step 2: Sludge Volume Assume that the thickened sludge will have a concentration of 4% (40 kg/m33).
  Sludge volume = Sludge concentration = 16240 = 4.05 m3/daySludge Volume= Concentration= 40162= 4.05 m3/day
- Step 3: Sludge Digestion Give the digestion process 20 days.

4.2. Roughly Estimation of STP

We will add up the costs of each part to get the overall cost of the Sewage Treatment Plant (STP) using the data that has been provided.

Scenario 1: Water Consumption at 50 LPCD

- Screen Chamber: ₹3,33,096.33
- Grit Chamber: ₹1,32,431.25
- Primary Sedimentation Tank: ₹14,06,250
- Aeration Tank: ₹69,21,875
- Secondary Treatment Plant: ₹48,75,000
- Secondary Clarifier: ₹13,50,000
- Disinfection Unit: ₹1,35,20,875
- Sludge Treatment: ₹20,12,500

Total Cost for Scenario 1: ₹3,05,71,027.58

Scenario 2: Water Consumption at 100 LPCD

- Screening Unit: ₹7,21,041.00
- Grit Chamber: 1,61,718.75
- Primary Sedimentation Tank: 28,12,500
- Aeration Tank: 1,38,43,750
- Secondary Treatment plant : ₹97,50,000
- Secondary Clarifier: 27,00,000
- Disinfection Unit: 2,65,41,745
- Sludge Treatment: ₹40,25,000

Total Cost for Scenario 2: ₹6,89,55,754.75

Final Summary :

- Total Cost for Scenario 1 (50 LPCD): **₹3,05,71,027.58**
- Total Cost for Scenario 2 (100 LPCD): **₹6,89,55,754.75**

5. Conclusion

5.1. Conclusion

Our initiative, which aims to provide Devachi Uruli with sustainable wastewater management solutions, embodies both advancement and a strong dedication to environmental care. By combining cutting-edge technology with neighborhood-based projects, we see a day when wastewater is not only treated but also turned into a useful resource. In order to protect community health and maintain the environment for future generations, our strategy calls for the installation of effective sewage treatment facilities, the promotion of water conservation measures, and the establishment of strong waste management systems. We have made a significant investment, estimated at ₹3,05,71,027.58, or ₹6,89,55,754.75, to ensure the long-term viability of Devachi Uruli. This project represents a paradigm change toward a future where responsible water management takes center stage in efforts to promote rural development and is cleaner, healthier, and more prosperous.

5.2. Future Scope

The future scope of our project in Devachi Uruli, which focuses on waste treatment and water management, lays out a route towards sustainable prosperity. We want to guarantee a steady supply of water for homes and farms by implementing cutting-edge techniques like rainwater gathering and sewage treatment plants that are very effective. Furthermore, we're dedicated to tackling problems with solid waste by implementing effective recycling and trash management initiatives. We hope to reduce environmental risks and build a resilient and prosperous community by using this all-encompassing approach. Our goal is to make Devachi Uruli a symbol of self-sufficient, sustainable rural living that will benefit present and future generations.

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