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Effective Utilization of Waste Water Management in Nagercoil Town

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ABSTRACT: The main aim of the project is to reuse the wastewater effectively in Nagercoil Town. The wastewater will collect from 4 main areas of nagercoil. In this areas all municipality and sewage waste are dumped. These areas comes under the river zones. The areas are Ozhuginasari, Putheri, Suchindrumram, Parvathipuram. After collecting the samples from these places, the collected water will analyze to find out their chemical composition in wastewater. And making the decision, how to treat the waste effectively. The chemical composition result of these wastewater evaluated by GPS-X software (Wastewater Modeling and Simulation Software/ GPS-X-Hdromantis) to find the better result of the project. Then analysis are made to find the reuse options of such wastewater. The reuse options may be portal and non portal type. Treated waste water for potable purpose such as for drinking and recharge of ground water require higher standard of water quality. Whereas the non potable reuse such as domestic purpose like gardening, toilet flushing, car washing, industrial reuse, recreational, agriculture, landscape irrigation, wetland applications etc requires low standard of treated waste water quality.

I. INTRODUCTION

Water is one of the important renewable natural resource, no one can survive without it either humans or animals. India is rich in terms of different natural resources, water is one of them. Water comes from different sources such as precipitation, surface water and ground water. Which play an important role in India's supply of water. It has been found that the demand for water is increasing substantially due to increasing population, growing urbanization, and rapid industrialization combined with the need for raising agricultural production. The supply of water is inadequate compared to its growing demand in our country.

On Earth Only 2.5% of the Earth's water is fresh water, and 98.8% of that water is in ice and groundwater. Less than 0.3% of all freshwater is in rivers, lakes, and the atmosphere. India home to 16 percent of the world's population has only 4 percent of the world's water resources. So that in India the water demand is in very high rate. Increasing water demand and decreasing water sources and reservoirs calls for an effective and efficient use of water. The domestic and industrial wastewater can be reused or recycled.

II. WASTEWATER REUSE

On-site wastewater reuse can reduce water use in both urban and rural households. At present, most homes use potable (drinkable) water for practically everything in the house and garden. We are literally flushing our drinking water down the toilet! The articles Reducing water demand, Rainwater and Outdoor water use also have information on reducing potable water use. Opportunities to reuse wastewater and regulation of its treatment vary according to where you live. Urban households typically have a connection to a centralised, or reticulated, sewage

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system, whereas rural households manage their wastewater on site. Check with your local council or state health authority for advice on the regulations in your area.

Two types of wastewater are created in a home: greywater and blackwater.

- **Greywater** is wastewater from non-toilet plumbing fixtures such as showers, basins and taps.
- **Blackwater** is water that has been mixed with waste from the toilet. Because of the potential for contamination by pathogens and grease, water from kitchens and dishwashers should be excluded from greywater and considered as blackwater.

III. ADVANTAGES OF REUSE

By using wastewater as a resource rather than a waste product you can:

- Reduce water bills
- Use fewer water resources
- Irrigate the garden during drought or water restrictions
- Cut down the amount of pollution going into waterways
- Help save money on new infrastructure for water supplies and wastewater treatment
- Decrease demand on infrastructure for sewage transport, treatment and disposal, allowing it to work better and last longer.

IV. OBJECTIVES

The main aim of the project is to reuse the wastewater effectively. The high quantity of water is wasted by peoples and their demand is increased on future. On 2051 the population will increase up to 30%. The population growth also require high water need. So that to meet the demand, water reuse is the better solution, the water can be reuse for various purpose successfully. So many countries now followed this concept to reduce the water demand. So I give the suggestion, to reuse the wastewater effectively in NAGERCOIL TOWN.

- To find the wastewater dumping areas.
- To find out the treatment required for the wastewater.
- How to manage the wastewater effectively.
- To find out the reuse options of wastewater.

V. ALTERNATIVE OPTIONS TO MEET WATER DEMAND

Diversifying our water sources helps secure our water supply system against droughts and floods. Using alternative water sources to meet demand makes better use of all the water available to us, and saves drinking water for specific purposes where high-quality water is needed.

1. Recycled Water/Reuse The Water
2. Stromwater Harvesting
3. Water Sensitive Urban Design Treatments
4. Rainwater Collection
5. Sewer Mining

VI. COLLECTION OF SAMPLES (WASTE WATER)

Nagercoil is a town in the southernmost Indian district of Kanyakumari and a municipality and administrative headquarters of Kanyakumari District in Tamilnadu. The town is situated close to the tip of the Indian

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peninsula, locked with the Western Ghats on three sides. The area of the town is 24,27 squ.K.M. Latitude and longitude coordinates are: **8.174450, 77.432159**.

The samples will collect from 4 places. That are, Ozhugunaseri, Putheri, Suchindram, Parvathipuram.

VII. TESTING OF SAMPLES

To find out their chemical composition, test will conduct on the samples. The water samples will collect in 2 litter capacity bring to the laboratory within 6 hrs of collection.

PARAMETER	RAW SEWAGE 1	EFFLUENTS
PH	6.4	5.5 - 9
BOD	300 mg/l	≤ 20 mg/l
COD	600 mg/l	≤ 250 mg/l
OIL and GREASE	50 mg/l	≤ 5 mg/l
Total suspended solid	600 mg/l	≤ 30 mg/l
Nitrogen	61 mg/l	≤ 5 mg/l
Ammonia Nitrogen	50 mg/l	≤ 50 mg/l
phosphorous	5 mg/l	≤ 5 mg/l

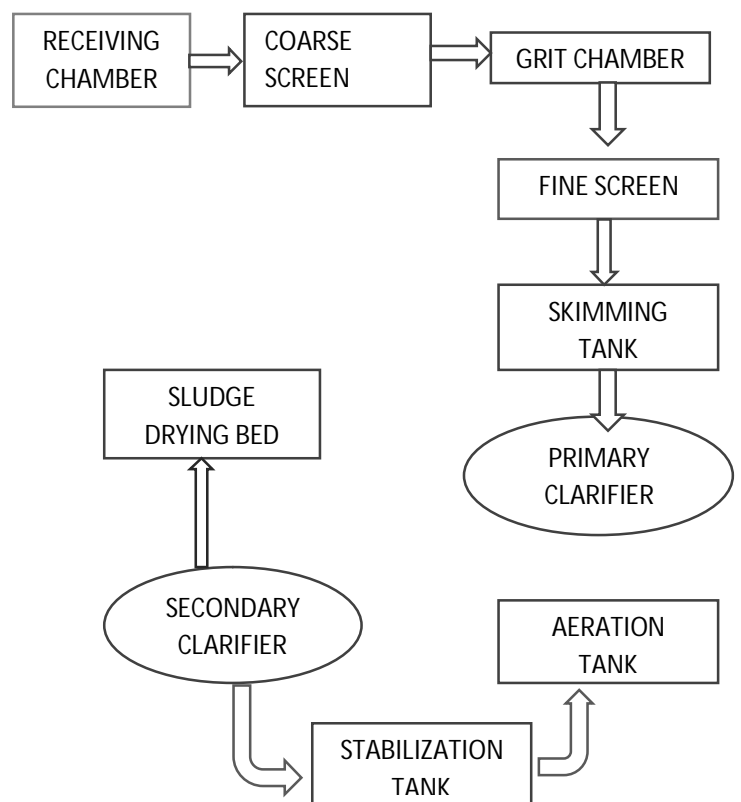
VIII. CALCULATION OF SEWAGE GENERATION

Ultimate design period = 30 years
 Forecasted population at 2051 = 315801
 Percapita water supply = 135 lpcd
 Avg water supply per day = 31580×135
 = 42633135
 = 42700000
 = 42.7 MLD
 Avg sewage deneration per day = 80% of supplied water
 = 0.8×42.7
 = 34.16 MLD
 In cumec
 Avg sewage generation per day = $34.16 \times 0.0115740741$
 Avg discharge = 0.95 cumec
 Max discharge = $3 \times$ Avg discharge
 = 1.185 cumec

RECEIVING CHAMBER

Desing

Desing flow = 1.185 cumec
 Detention time = 60 sec
 Volume required = flow x detention period
 $V_{req} = 71.1 \text{ m}^3$



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Provide, depth = 3 m
 $V = A \times D$
 $A = 23.7 \text{ m}^2$
B = 3.5 m and L = 7 m

Check
 Volume designed = $6.88 \times 3.5 \times 3$
 $V_{des} = 7 \times 3.5 \times 3$
 $V_{des} > V_{req}$

Receiving chamber is designed for the size of
L : B : D = 7 m x 3.5 m x 3 m

.....

IX. DESIGN OF COARSE SCREEN

peak discharge of sewage = $1.185 \text{ m}^3/\text{s}$
Assume the velocity at avg flow is not allowed to exceed 0.8 m/s
The net area screen opening required $Q = AV$
 $A = 1.185/0.8 = 1.48 \text{ m}^2$

Assume
Clear opening between the bar = 40mm = 0.04 m

Size of the bar = 75 mm x 10 mm

Width of channel = 1 m

- Size of coarse screen L x B = 4.3 m x 1.45 m
- Skimming tank is designed for the size of 1.6 m x 1.1 m x 3 m
- settling tank with 33 m dia and 3.2 m water depth (with free board 0.3 m)
- Dimension of secondary sedimentation tank

L x B x D = 80 m x 40 m x 3.5 m

- AERATION TANK L : B : D = 70 m : 10 m : 4.5 m
- STABILIZATION TANK

Wet well dimension = 12 m x 5 m x 3 m + 0.5 m (F.B)

Dry well dimension = 12 m x 12 m

SOFTWARE USAGE

GPS-X SOFTWARE Are used (wastewater modelling and simulation software)

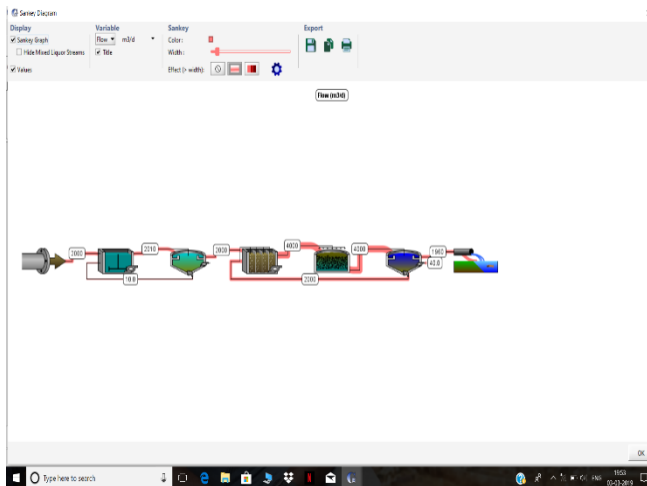
Using GPS-X software, the plan model for a polluted sewage purifier tank is prepared. This plan model acts as a original plant and when the input such as BOD, COD, TSS of software, etc is given to the desults. The result will be process for treating such sewage or polluted water.

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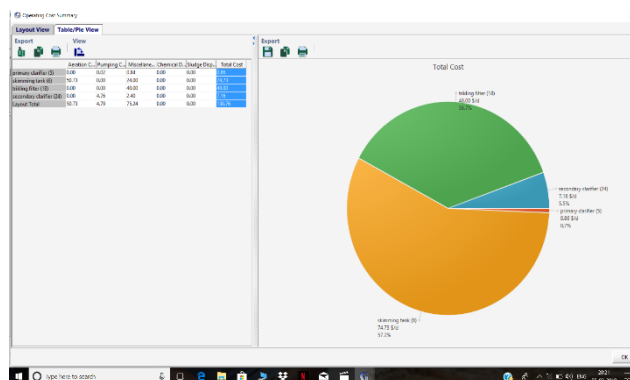
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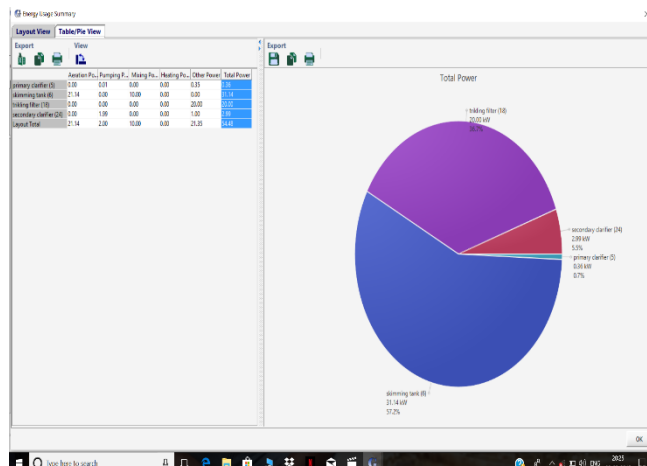
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Out put of the plant



Total cost required for the treatment



Total power required for treatment

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Wastewater Reuse Application

Treated wastewater has been used to supplement or replace natural water resources in several ways. The intended reuse application is the major factor influencing the level of treatment needed to protect public health and the environment and the degree of reliability required for the treatment processing and operation.

Wastewater reuse categories

1. Agricultural irrigation
 - Crop irrigation
 - Commercial nurseries
2. Landscape irrigation
 - Parks
 - School yards
 - Freeway medians
 - Golf courses
 - Cemeteries
 - Greenbelts
 - Residential
3. Industrial recycling and reuse
 - Cooling
 - Boiler feed
 - Process water
4. Ground water recharge
 - Ground water replenishment
 - Salt water intrusion Control
5. Recreational/environmental uses
 - Lakes and ponds
 - Marsh enhancement
 - Stream flow augmentation
 - Fisheries
6. Non potable urban uses
 - Fire protection
 - Air conditioning
 - Toilet flushing
7. Potable reuse
 - Blending in water supply reservoir
 - Pipe to pipe water Supply

X. CONCLUSION

Nagercoil municipality has been upgraded with corporation status. The steady incremental in the city population result in the increase of domestic sewage generation. But still now there is no treatment plant. So it is required to construct a sewage treatment plant with sufficient capacity to treat the sufficient sewage.

The project also deals with the design of sewage treatment plant and its major components such screening chamber, grit chamber, skimming tank, sedimentation tank, secondary clarifier, activated sludge tank and sludge drying bed.

It covers the 10.54 sq.km, 50 wards of Nagercoil municipal corporation for next 30 years and its increased population. Nagercoil city, the Head Quarters of the kanyakumary district is next to thirunelveli district.

By executing the design of the project the entire sewage of the city can treat effectively and efficiently.

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