Design of Sewage Treatment Plant with Experimental Investigations and Analysis of Waste Water At Alanthurai

P. B. Narandiran,
Assistant Professor,
Department of Civil Engineering,
Nandha college of Technology,
Erode.

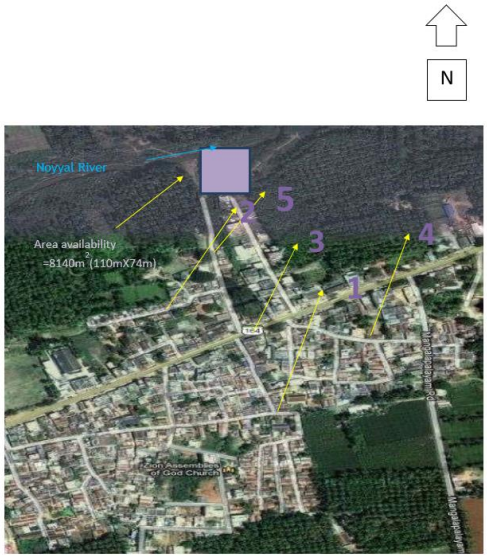
Radhamani. S[1], Manikkakumar.V[2],
Saranya. M[3], Sridhar. G[4]
UG Scholars,
Department of Civil Engineering,
Nandha college of Technology,
Erode.

***Abstract*:-Alanthurai has been upgraded with panchayat status. The steady incremental in the panchayat population results in the increase of domestic sewage generation. But still now there is no treatment plant. So it Necessary to adopt a Sewage Treatment Plant with sufficient capacity to treat the sewage.Which is Generated from the various Sources. In this project we designed a sewage treatment plant (Trickling Filter) to treat the sewage water which is dispossed in the noyyal river because of domestic use.For that purpose we collected a water sample from various location like alanthurai, Pooluvapati. We done Physical,Chemical,biological Charaacteritics analysis by various test. The test results are tabulated and compared with standarad value.From the test result we adopted the 3926m3 trickling filter unit with various units likes screening.grint chamber sedimentation tank ,tricking filter unit and sludge digestion tank. By adopting this unit the characteristics values of water get reliable values to the standard value. The project covers the 8140 sq.meter of Alanthurai panchayat for next 15 years till 2032 and its population calculated for that sewage generation.**

1. .INTRODUCTION

Sewage treatment is the process of removing contaminants from wastewater and household sewage, both runoff and domestic. It includes physical, chemical, and biological processes to remove physical, chemical and biological contaminants. Its objective is to produce a treated effluent and a solid waste or sludge suitable for discharge or reuse back into the environment.

This material is often inadvertently contaminated with many toxic organic and inorganic compounds. Sewage implies the collecting of wastewaters from occupied areas and conveying them to some point of disposal. The liquid wastes will require treatment before they are discharged into the water body or otherwise disposed of without endangering the public health or causing offensive conditions. As the panchayats have grown, the more primitive method of excreta disposal have gain place to the water-carried sewerage system. Even in the small cities the greater safety of sewerage, its convenience, and freedom from nuisance have caused it to be adopted wherever finances permit.



2. OBJECTIVES OF THE PROJECT

The main Objectives of the projects are

1. To analyse the Physical, chemical and biological characteristics of the collected water sample .
2. To Compare the Test Results with Standard values.
3. To adopt the Proper Treatment unit to achieve the standard value.
4. To analyse the Quality of the treated sewage water for irrigation purpose.

3. DESIGN DETAILS OF MESARUMENT UNITS

Characterstic of sewage water

Comparison study where carried out with the tested results used for calculation and the standard limits. Which state that our sewage water comes under medium-strong rang is prescribed in the table below

Characterstic	Test result	Weak	Medium	Strong
TSS mg/l	200	100	200	350
BOD mg/l	200	100	200	400
COD mg/l	500	175	300	600
AMMONIA mg/l	5	5	10	20

Details of the various treatment units

Treatment	purification	Process employed	BOD Remoaval	Removal of suspended dissolved solids	Removal of bacterial load	Disposal of residue
Preliminary	All floating materials.	Coarse and fine screen.	5-10	2-20	10-20	Burnings
Preliminary	Heavy settlable inorganic solids	Grit chamber	10-20	20-40	10-20	Burnings
Primary	Suspended settlable organic solids.	Sedimentation tank	30-35	60-65	25-75	Stabilized indigestion tank
Secondary	Industrial and domestic .sewage water	Trickling filter	0.5-3.0	-	-	Stabilized indigestion tank

4. POPULATION FORECAST

AREA	YEAR	POPULATION	INCREAMENT	INCREAMENT INCREASE
ALANTHURAI	2001	5448		
ALANTHURAI	2011	7173	1725	
ALANTHURAI	2021	13276	6103	4378
POOLUVAPATTI	2001	9168		
P POOLUVAPATI	2011	12403	3235	
POOLUVAPATTI	2021	22824	10421	7186

5. POPULATION DETAILS

Population forecast is done using INCREMENTAL INCREASE method.

design period of Treatment plant is 15 years.

Total no of ward in Alanthurai & Pooluvapatti panchayat = 15 Nos.

Sewage generated from only 6 wards.

In Alanthurai panchayat = 3 Nos.

In Pooluvapatti panchayat = 3 Nos.

Total population in 6 wards (P) = 6582 Nos.

Average of increase (x) = 8785 Nos.

Average incremental increase (Y) = 5782 Nos.

6. POPULATION CALCULATION

Calculation of total population using Incremental increase method

$$Po = P + n*x + n*(n+1/2)* y$$

$$P2032 = 6582 + 1.5*8785 + 1.5*(1.5+1/2)* 5782$$

$$P2032 = 30601 \text{ Nos}$$

Population in 2032 is 30601 Nos for the design period of 15 years.

7. TRAETMENT PLANT DESIGN

- Design of Screen Chamber
- Design of Grit Chamber
- Design of Primary Sedimentation Tank
- Design of Trickling Filter
- Design of Simple Aeration Tank
- Design of Anaerobic Sludge Digestion Tank

(Treatment plant design attached with full book soft copy because heavy pages should be accommodated)

8. RESULT AND DISCUSSION

LOCATION	PDD	ADD	AMD	PMD	MD	ACCEPTED INLAND FLOW	DATA FOR CALC
Colour	S.blackish	S.blackish	S.blackish	S.blackish	S.blackish	All effort to remove	S.blackish
Ph	8.0	7.9	7.88	7.8	7.58	5.5-9.0	8
Ph.alkalinity as $CaCo_3$	0	0	0	0	0	0	0
IRON as Fe_4	2.16	2.04	2.16	2.4	2.28	3.0	3
Free AMMONIA	2.5	3.1	3.50	3.6	3.7	5.0	3.7
NITRATE as NO_3	15	14	13	13	17	10	17
FLUORIDE as F	0.4	0.6	0.8	0.8	0.8	2.0	1
Phosphate	2.2	2.7	2.9	3.0	3.5	5.0	3.5
BOD	162	169	176	135	150	30	200
COD	422	439	457	353	375	250	500
Manganese	0	0	0	0	0	2.0	0
TSS	154	162	175	108	136	100	200

9. CONCLUSION

This project was very useful and it enabled to know various problems met practically in the design of “SEWAGE WASTE WATER TREATMENT PLANT”. It helped to abreast with the various methods used in treating waste water. We gained practical knowledge about design and construction by visiting the field.

Given the overall sanitation situation in India, there is a need to promote decentralized initiatives in sewage waste water treatment by providing incentives and a supporting policy environment and through capacity building of implementing institutions and stake holders.Decentralized and low-cost options are commonly viewed as solutions for the poor and / or for underdeveloped areas, raising of the profile of low-cost options and alternative technologies as well as of making it 'fashionable' to minimize waste going out of the habitats at micro-level and also at a macro-level at village precincts etc., can go a long way in changing people’s mindsets towards waste -minimization and up -gradation of the environment. More specifically, there is a need for exchange of information and innovations amongst rural and urban bodies and technical support for introducing alternative technologies and processes. Finally, concept – Sewage Waste water Treatment plant presents an opportunity to change the mind-set in the waste management sector away from “flush and forget” systems to recycling in the form of “waste to resource” systems thus aspiring to conserve and optimize all natural resources such as water.

10. REFERENCE

1. BIS 3025, 1964- Methods of Sampling and Tests (Physical and Chemical) for Water used in Industry, UDC 543.3, New Delhi.
2. Decentralised Wastewater Treatment Systems (DEWATS) and Sanitation in Developing Countries by Bernd Gutterer, Ludwig Sasses, Thilo Panzerbieter and Thorsten Reckerzügel.
3. Decentralized Wastewater Management –An overview of community initiatives, Er. Ajit Seshadri, Head- Environment, The Vigyan Vijay Foundation, New Delhi.
4. DEWATS -Decentralized Wastewater Treatment Systems,BORDA (Bremen Overseas Research And Development Association) Forum.
5. Sewage disposal and air pollution engineering (S.K.Garg).
6. Tency Baetens, "Centralised wastewater treatment does not work", Down to Earth 2004
7. Wastewater treatment concepts & design approach by (G.L.Karia, R.A.Christian).
8. Water supply engineering (S.K.Garg).