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Feasibility Check and Design of Vertical Sewage Treatment Plant in Katraj (Pune) Region

Pravin A. Manatkar[1], Nutan N. Darade[2], Shilpa G. Gadpaile[3], Aboli R. Jadhav[4], Sarita S. Jadhav[5].
[1]*Assistant Professor, Civil Engineering Department, Trinity Academy of Engineering, Pune*
[2, 3, 4, 5]*Student of B.E (Civil Engineering), Trinity Academy of Engineering, Pune, Maharashtra, India.*

***Abstract:** India is developing country. Therefore, there is rapid development of cities and other area. Also the population is increasing day by day in high rate. And so the land problem is occurred in cities. The huge amount of waste water is generated by people every day. Therefore, the need to treat this waste water is essential. The central waste water treatment plant is not able to treat the whole waste water generated in cities therefore provision of small treatment plants at various regions is good solution. But due to land problems in cities i.e the unavailability of land the conventional horizontal water treatment plant is not applicable because they required the large area. The vertical treatment plant is best alternative to this problem.*
***Keywords:** Rapid development, Increasing population, Waste water generation, Land problem, Land cost.*

I. INTRODUCTION

The rapid development, urbanization, migration of people the residential, commercial, industrial, institutional and recreational area takes the most of place in Pune (KatrajSahakar Nagar Swargate Shivajinagar etc.) due to availability of land is major problem in Pune city. Number of sewage treatment plant present in Pune city not sufficient to treat amount of sewage created but now a day it is very essential to do Effective treatment for sewage. As a part of smart city sewage treatment is very essential component, study work will helpful to achieve goal of smart city. Therefore, vertical treatment plant is the alternative ofthe all problems. It requires less space, low operating cost, also the high reduction of BOD, suspended solids and pathogens. Due to gravity operation it is low in cost and easy to maintain.

The reality is, however, that most wastewater produced globally remains untreated causing widespread water pollution, especially in low-income countries: A global estimate by UNDP and UN-Habitat is that 90% of all wastewater generated is released into the environment untreated. In many developing countries the bulk of domestic and industrial wastewater is discharged without any treatment or after primary treatment.

Figure 1: Location of Upper IndiraNagar slope

II. LITERATURE REVIEW

Research papers being national and international shows that the problems associated with wastewater reuse arise from its lack of treatment. The challenge thus is to find such low-cost, low-tech, user friendly methods, which on one hand avoid threatening our substantial wastewater dependent livelihoods and on the other hand protect degradation of our valuable natural resourcesTherefore evaluations may determine required recommendations and focus on modification requirements for the STP.

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III. METHOD

The modification in conventional STP or alternation to land problem vertical treatment plant can be better solution. For this firstly we have to select the high elevation ground or slopy land so as to acieve gravity flow in STP. The primary data related to that area should determine like present population, forecasting, proposed population, elevation, sewage generated, discharge units, etc. According to that data design units of STP i.e bar screens, grit chamber, primary settling tank, trickling filter, secondary settling tank ,sludge digester. drying beds etc. with the help of design standards and steps.Draw the flow diagram for conventional treatment plant, also for inclined surface plant, and vertical treatment plant. Make proper planning for inlets and outlets for each unit of treatment plant so as to work the treatment plant effectively. Flow of water is calculated by considering the population and sewage generated i.e 80% of water supply in the area. Starting with screening which removes large floating matter from the flow and reduce the inorganic matter. Sedimentation tank settles the small size particles and the remaining inorganic and organic matter present in the water are treated by the process of aeration with trickling filter.

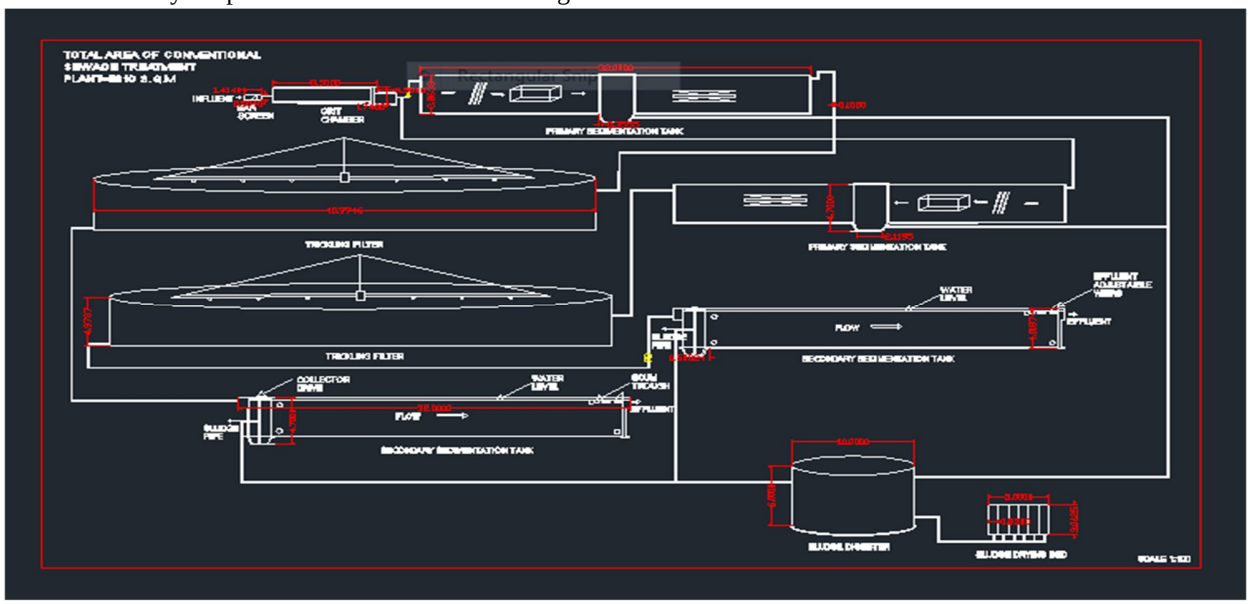


Figure 2: AutoCAD Drawing Of Horizontal STP

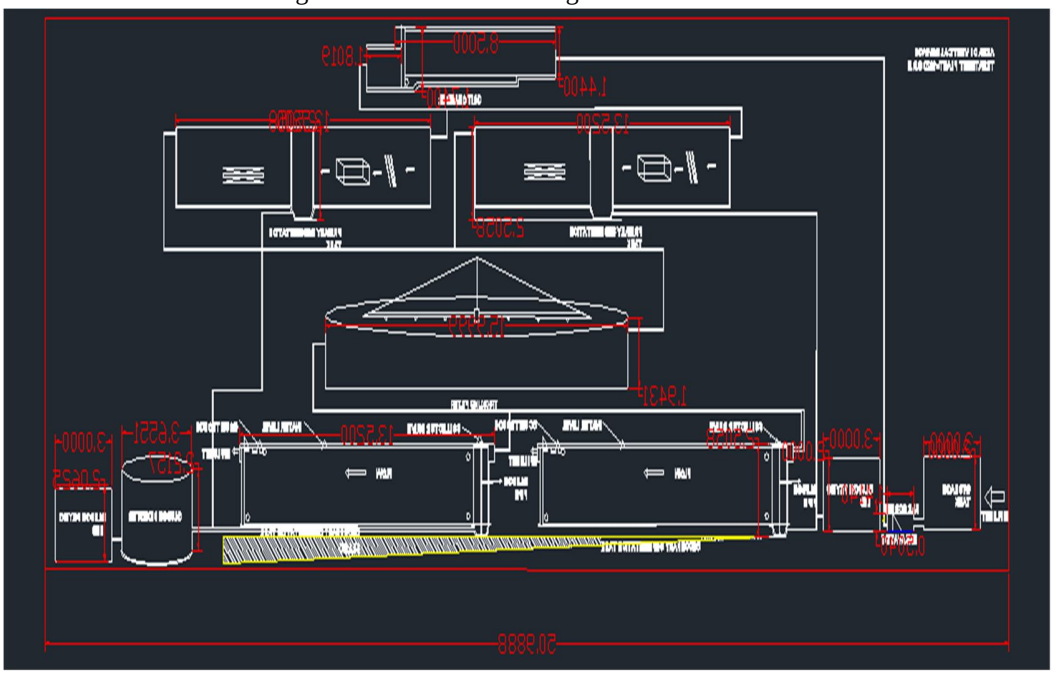


Figure 3: AutoCAD Drawing of Vertical STP

IV. RESULT

This analysis and design state that the area required for conventional i.e. horizontal STP is too large therefore sufficient land is not available in that area. For vertical STP area required less than horizontal STP. Therefore land cost is reduced and also total estimation cost is less as compare to horizontal.

Table 1: Design dimension of vertical STP (Sewage Treatment Plant)

Units	Length	Width	Depth
Bar screen	1m No.of bars 70.	1.14m	0.504m
Grit chamber	10m	1.53m	1.7m
PST (Primary Settling Tank)	13.52m	3.38m	2,5m
Trickling filter	Diameter =41m		4.9m
SST(Secondary Settling Tank)	13.52m	3.38m	2.5m
Sludge digester	diameter=3.65m		2.21m

Table 2: Area & Cost Comparisons of STP (Sewage Treatment Plant)

Horizontal STP	Vertical STP
Area:5010m²	Area:1020m²
Cost: 12525000Rs	Cost: 25,50,000Rs

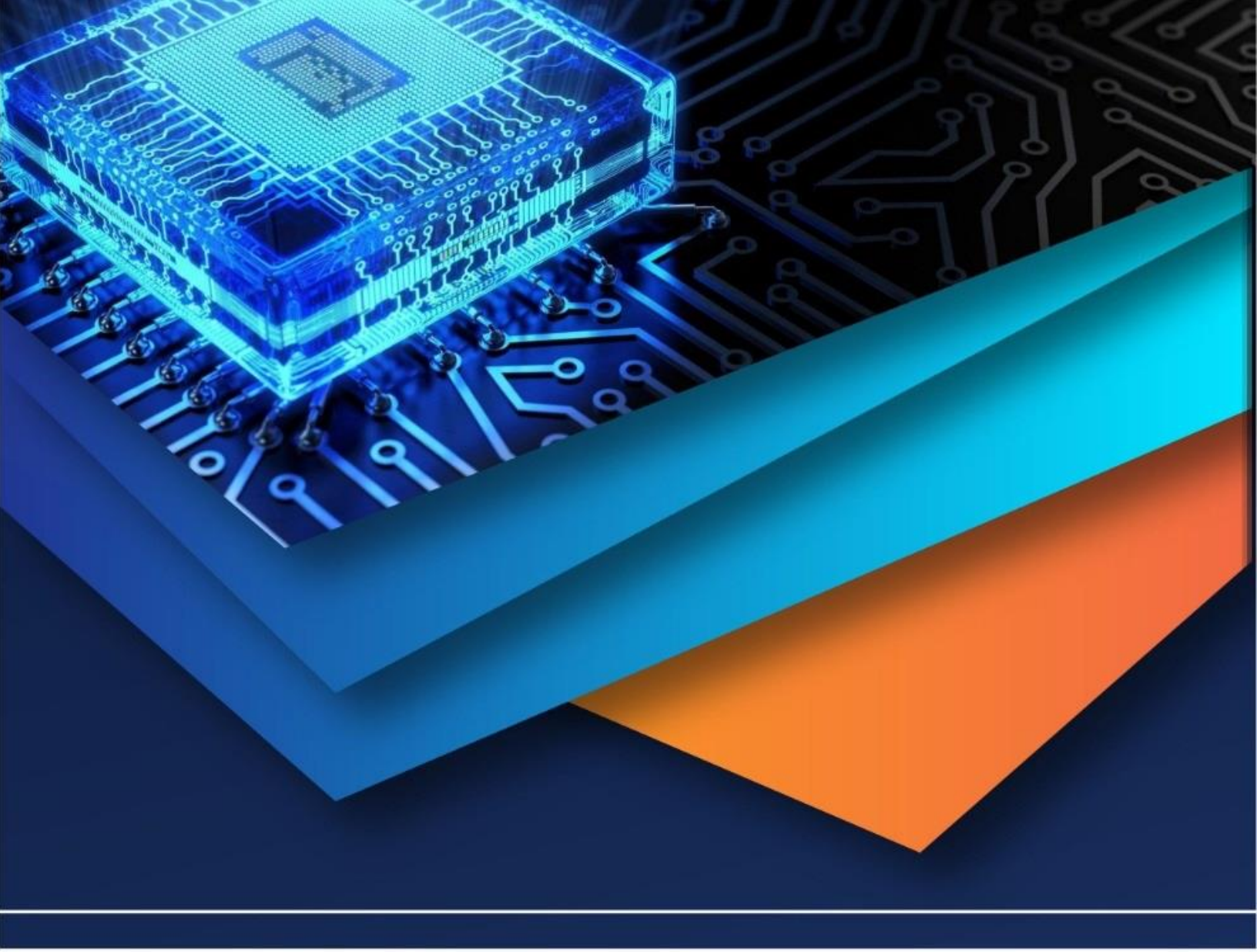
V. CONCLUSION

During the course of project study, following conclusion were derived:

A. Area required for horizontal STP is large comparatively vertical STP therefore land cost required for the STP is also more.
B. By this analysis it concludes that area required for Horizontal sewage treatment plant is 5010m² and vertical STP is 1020m².
C. In city area the land cost is much high and increasing day by day. So to solve this problem vertical STP is preferable.

REFERENCES

[1] Mr. Kawthale Akash D., Mr. PatilVijaykumar A. Ms. IngaleSnehalataG,Waste water treatment , February 2017
[2] Hemath Naveen K.S, HemaPriya.M, Swathi.S.D,Vinothan K.G, Sewage Treatment Methodology
[3] David Moses Kolade, Paper on industrial wastewater treatment processes 2016
[4] EsiAwuah, Lawrence Darkwah, Richard ArthurandGabriel Osei, Water quality assessment of a wastewater treatment plant in a Ghanaian Beverage Industry November 2017
[5] Rakesh Singh Asiwal, Dr. Santosh Kumar Sar, Shweta Singh, Megha ,Wastewater Treatment by Effluent Treatment 2006
[6] Lacina Coulibaly, Jacques Kouakou, IssiakaSavané andGermainGourèn , Domestic wastewater treatment with a vertical completely drained pilot scale constructed wetland planted with Amaranthus hybrids
[7] Sanjeev Kumar Sinha, Vikas Kumar Sinha, Samir Kr. Pandey, Anup Tiwari , A Study on the Waste Water Treatment Technology for Steel Industry: Recycle And Reuse.
[8] Prachi N. Wakode, Sameer U. Sayyad, Performance Evaluation of 25MLD Sewage Treatment Plant (STP) at Kalyan



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