

DESIGN OF WATER TREATMENT PLANT TO PULIVENDULA MUNICIPAL CORPORATION OF KADAPA (Dt), ANDHRA PRADESH

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Abstract

Now a day's water scarcity is burning issue. As it is quite obvious that there is day to day increase in population, the demand for water also increases to satisfy the needs of the community there comes a necessity to redesign the existing treatment plants, or design the new treatment plants. Redesign or design includes hydraulic design and process of treatment of water in the plant. For hydraulic design of the plant, we need to forecast the population. We forecasted the population by geometrical method. To design the treatment process of water we need to know the properties of raw water. The physical, chemical and biological properties of water have been determined. The average measured values of physical properties are Turbidity-15NTU, colour-97.7%T, and chemical proprieties are p^H -7.18, TDS-550 μ s, conductivity-559 μ s, D.O-6ppm, hardness-162ppm, chlorides-16ppm, alkalinity-165ppm, BOD-6ppm, nitrates-5ppm, and sulphates have found to be zero ppm. The method of treatment of raw water is based on these properties.

We are designing the water treatment plant for pulivendula. The source of raw water is Chitravathi River from here through canal the water is stored in nakkalapalli storage tank. The properties of water changes based on its surface source. Thus there is a lot of importance to design treatment plant to pulivendula municipality. The dimensions of screens 0.61x0.31m, sedimentation tank 34.5x8.6x3m, and flash mixer dimension 1.2x3m, Clariflocculator dimension is 19m diameter, 2.9 m height, and filter system total height is 2.7m.

Keywords: Characterization, Hardness, Water treatment plant etc...

1. INTRODUCTION

It is very difficult to ascertain the quantity of water required for a particular town. It involves the assumptions of many variable factors and foresight of the designer plays an important role in arriving at this quantity. However the problem of estimating the quantity of water may be tackled by studying in detailed the following two factors they are rate of demand and population.

2. METHODOLOGY

SYSTRONICS WATER ANALYSER 371 is a micro controller based instrument for measuring P^H , DO, TDS, Temperature, Colorimetric and Turbidity, in water sample one at a time. The water analyser 371 provides automatic and manual temperature compensation. All the experimental methods done by standard methods and Instrument.

3. DESIGN AND DETAILS OF TREATMENT PLANT UNITS

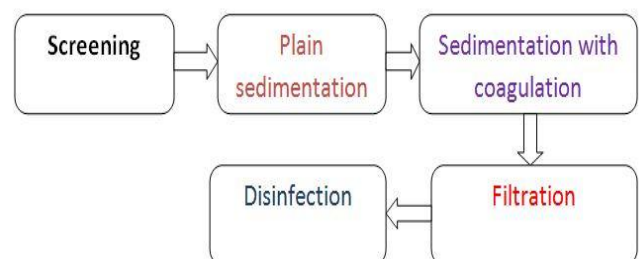


Fig- 1 Flow diagram of water treatment process

Average total water demand of Pulivendula municipality estimated as 13Million Litre per Day. Existing treatment plant capacity is 7.4 MLD. Hence we are designing treatment plant for 5.6 MLD capacity treatment plant Dimensions of screens L*B = 0.6*0.31 m

Dimensions of plain sedimentation tank length- 34.5m, width- 8.6m and height =3m

Detention time of sedimentation tank =2.5hr

Height of flash mixer = 3m

Diameter of flash mixer=1.2m

Detention time of flash mixer =30sec

Diameter of Clariflocculator =19m

Height of Clariflocculator=2.9m

Detention time of Clariflocculator = 2.5hr

Diameter of flocculator zone =8.6m

Filter system

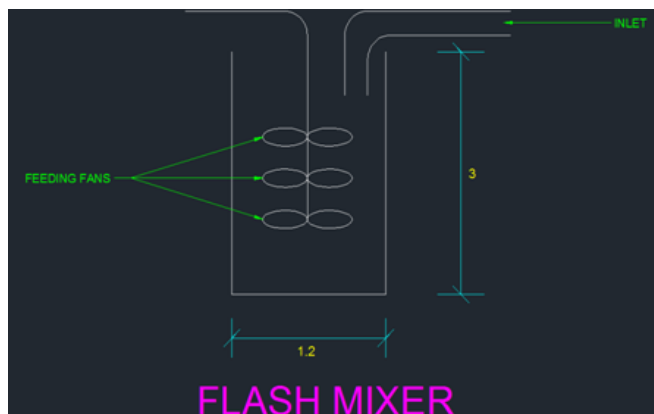
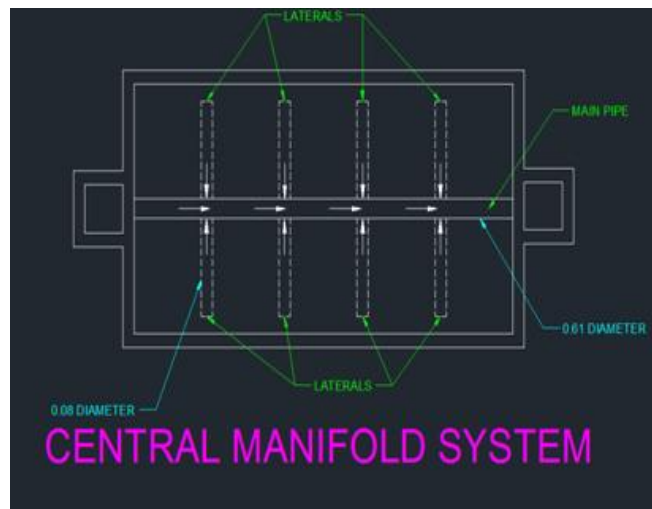
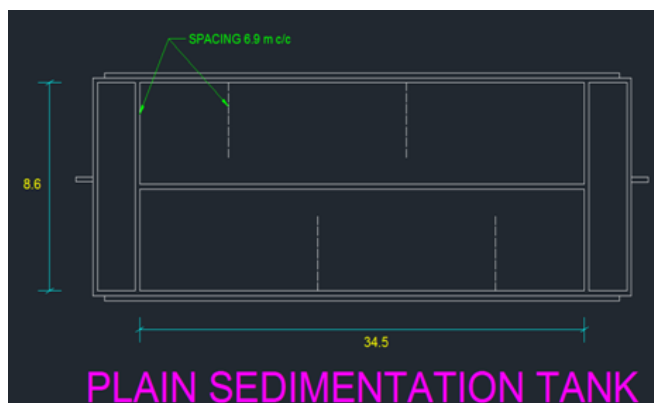
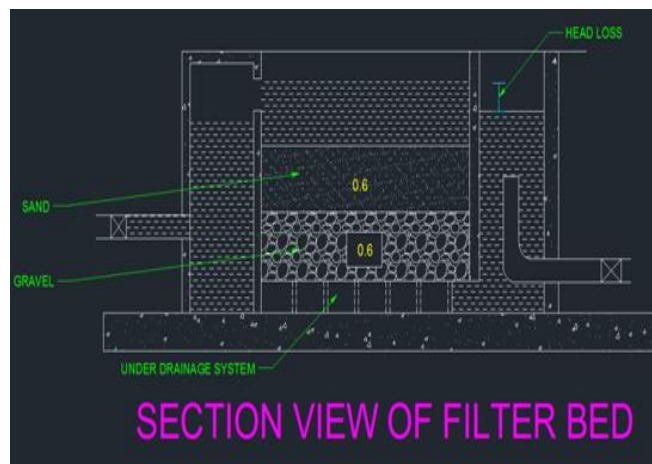
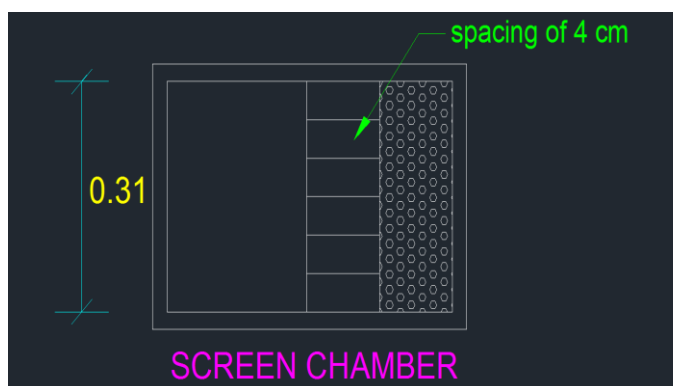
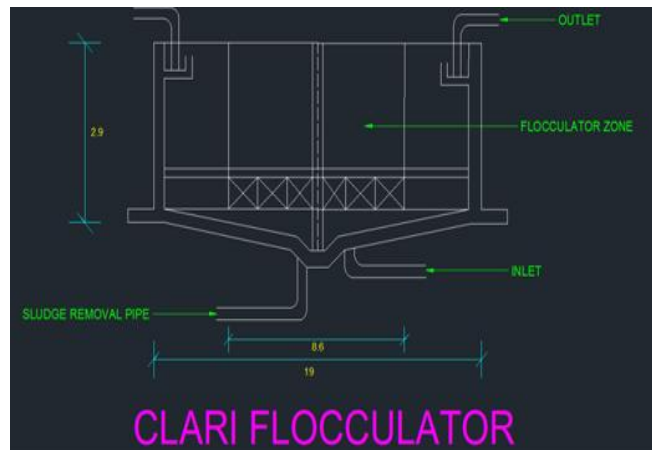
Number of filters = 3

Each filter bed size = 4.5*3.6 m²

Dimensions disinfection tank diameter =7m

Height =3m

Dimensions of clear water reservoir= 40*16*3



4. RESULTS AND DISCUSSIONS

Table -1 Physical and Chemical Characteristics of water

S.NO	Property	Raw water	Treated water	Permissible limit
1	Turbidity (NTU)	15	8	5-10
2	Colour(%T)	97.7	98.5	100
3	P ^H	7.18	6.94	6-8.5
4	TDS(mg/l)	550	303	500
5	Conductivity	559	975	-

	(μ s)			
6	Hardness	165	110	75-115
7	Chlorides (mg/l)	16.5	71	250
8	Alkalinity (mg/l)	165	264	600
9	Acidity(mg/l)	25	20	-
10	Nitrates(mg/l)	5	0	45
11	Fluorides (mg/l)	0.8	0.6	0.5-1.0
12	Sulphates (mg/l)	0	0	<3
13	Iron(mg/l)	0	0	0.3
14	DO(mg/l)	4	6	5-10
15	BOD(mg/l)	6	0	0

5. CONCLUSION

Average daily water demand of Pulivendula municipality as per 2011 census is found as 13MLD.

The average ranges of physical, chemical and biological characteristics of raw water quality are experimented and found out as physical properties are Turbidity-15NTU, colour-97.7%T, and chemical properties are p^H -7.18, TDS-550 μ s, conductivity-559 μ s, D.O-6ppm, hardness-162ppm, chlorides 16ppm, alkalinity-165ppm, BOD-6ppm, nitrates-5ppm, and sulphates have found to be zero ppm.

Some of the physical, chemical, and biological characteristics of raw water were found to be greater than permissible limit. To overcome this effect on public, it is better to design suitable water treatment plant. In this aspect we design water treatment plant to pulivendula according to necessity. The dimensions of screens 0.61x0.31m, sedimentation tank 34.5x8.6x3m, and flash mixer dimension 1.2x3m, Clariflocculator dimension is 19m diameter, 2.9 m height, and filter system total height is 2.7 m.

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BIOGRAPHY



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University 1st Rank in M.Sc (Mineral Chemistry) in 2001
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Science Academies (IASc-INSA-NASI) Summer research Fellowship in 2014

Books Authored:

K.Sesha Maheswaramma, Mridula Chugh, "Engineering Chemistry", Pearson Publication, 2013 (ISBN 978-81-317-7451-9).

Publications

Seven papers are published in internationally reputed journals and more than ten papers are presented in national and international seminars and conferences.

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As Prominent speaker, Invitee, Chairperson and facilitator for several regional and national level conferences and workshops.