

COMPATIBILITY OF DECENTRALIZE APPROCH FOR WASTE WATER COLLECTION AND TREATMENT INSTEAD OF CENTRALIZE APPROACH FOR SANTA CRUZ CONSTITUENCY, GOA

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ABSTRACT

This paper focuses on detail study of centralize sewer collection and treatment system proposed for Santa cruz Constituency in Goa, its efficiency and cost. Paper also highlights the decentralize approaches which can be carried out for the same, and review of the literature.

Keywords: Centralize Collection system, Centralize treatment, Comparison between centralize and decentralize collection and treatment, Decentralize collection system, Decentralize treatment.

I. INTRODUCTION

India is right now fighting with unclean and unhygienic environment and hence, many a new policies are implemented by the Government like 'Swatcha Bharat Abhiyan' and many more. One of the major part of this scheme is to provide waste water collection and treatment system to smaller to larger community.

Up till now collection systems and treatment of sewer was only available to urban areas. As a part of research it is found out that smaller community's outflow to natural water bodies makes equivalent effect as urban waste do, if directly discharged in water bodies. Hence Government of India is now concentrating on Smaller communities and their collection of waste water and treatment.

While planning sewer scheme in rural area, similar strategy was carried out as urban sewer collection and treatment. In urban areas, centralize collection with the help of pumping stations and treatment by centralize treatment plant is mandatory due to lesser availability of land and fast and rapid treatment requirement. But in smaller communities, land availability is not an issue. Hence the there is a lot of scope for reconsidering decentralize collection and treatment of sewer than that of centralize.

II. METHODOLOGY

Survey and tests of sewerage sample on field-

Topographical survey is essential part in designing of sewer collection system and treatment method. Topographical survey with the help of total station instrument was done and data compiled for designing. Tests on sample of raw water collected plays important role in deciding treatment method.

Tests which were carried out on the sample were for-

1. Dissolved Oxygen- 8.13 (Fresh sewer)
2. BOD-250 mg/lit
3. COD-450 mg/lit
4. TSS-300 mg/lit
5. TDS- 2360 mg/lit
6. PH- 8.3
7. Nitrates- 45 mg/lit
8. Phosphates- 5 mg/lit
9. Sulphates- 300 mg/lit
11. Chromium- 0.042 mg/lit
12. Lead- 0.08
13. Arsenic- 0.14

According to above tests it clarifies that the sewerage is purely domestic and no other harmful or poisonous metals and contents are present in raw collected water.

Study of Proposed Centralize collection system and treatment method in Santa Cruz-

Santa Cruz constituency is situated near Panaji city in Goa state. Authority has already taken a planning report from a private consultancy, for centralise collection and treatment system.

According to the project report-

- Santa Cruz having current population 39837 is divided into 18 zones according to topography.
- Total 10 pumping stations were proposed in scheme, varying from 4 m diameter to 7 m diameter. Out of which 1 is terminal and others are intermediate pumping stations. Rising mains are of Ductile Iron material.
- Diameters of collection system vary from 180 mm to 1200 mm in HDPE material. Total drainage pipe network proposed is 76 kms in project area.
- For sewage treatment plant 'Sequential Batch Reactor' process is proposed.
- Treatment plants total capacity proposed as 15 MLD considering design period of 40 years.
- Treated effluent is proposed to dispose in Mandovi river.
- Treated effluent parameters which are aimed to achieve are-
 - BOD- < 5mg/lit
 - COD- < 100 mg/lit
 - TSS- < 10 mg/lit
 - Nitrates- < 10 mg/lit
- Units like mechanical screens, solar sludge beds and DG set are proposed. Also the plant entirely works on SCADA and PLC basis.
- Total proposed cost of project- 241.55 Crores.

After studying whole scheme carefully, it is observed that, per capita cost of the project is above 60,000 which exceeds average cost by greater margin. The scheme is not much cost effective due to rigid approach of authority about centralize collection and treatment.

Study of Decentralise approach towards Santa Cruz referring to research paper-

Suitability of decentralize options is needed to be found before providing alternative to current centralise proposed collection and treatment system. ^[1]Mr. May A. Massoud, Akram Tarhini and Joumana A. Nasr have published a research paper and title of the paper was 'Decentralised approaches to wastewater treatment: Applicability in developing countries', according to paper, developing countries lack both the funding to construct centralized facilities and the technical expertise to manage and operate them. Alternatively, the decentralized approach for wastewater treatment which employs a combination of onsite and/or cluster systems is gaining more attention.

^[2]Mr Guleda Onkal and Ebrahim Demir have published a research paper, and title of the paper was 'Cost analysis of alternative methods for waste water handling in small communities' according to paper, it would be uneconomical and impractical to provide sewer systems and separate wastewater treatment plants (WWTP) for small communities. The decision process in wastewater planning is rather important in terms of comparing the alternatives considered.

^[3]Prof. Ahmed Fadel have published a research paper, and title of the paper was 'Low cost Technologies for water treatment and waste water collection and treatment' according to paper, small bore sewers for Wastewater collection and treatment can be useful for the advancement of low cost treatment and collection.

^[4]Mr Deulaye Kone and Martin Strauss have published a research paper, and title of the paper was 'Low cost options for treating faecal sludges (FC) in Developing countries- challenges and performance' according to paper, this article analyses and discusses the performances of low cost technology for treating faecal sludges (FS) in developing countries.

^[5]Mr Doulaye Kone, Olurfunke O. Cofie and Kara Nelson have published a research paper, and title of the paper was 'Low cost option for pathogen reducing and Nutrient Recovery from sludge (Faecal)' according to paper, faecal sludge from on-site sanitation systems is rich in nutrients and organic matter, constituents which contribute to replenishing the humus layer and soil nutrient reservoir and to improving soil structure and water holding capacity.

Experimental work

Characteristics of the sample of waste water needed to be analyzed and tested. Following tests have been conducted on sample of waste water-

- COD
- BOD
- DO
- TSS
- TDS
- PH
- Nitrates
- Phosphates

- Sulphates
- Heavy metals

III. DISCUSSION

Since the Experimental work as well as detail study about decentralize alternative has not yet completed, we have not concluded with the Results in this paper. But from the reference papers it can be seen predicted that Decentralize collection system and treatment can be a potentially strong alternative and needed to be further compared on various basis. From literature survey it can be seen that Decentralise option is preferable for smaller communities, it is also beneficial for developing countries like India, also the methods are cost efficient. But it can't be predicted at this stage before deep study and analysis, that decentralize approach in collection and treatment can be beneficial for Santa Cruz. The result may also be like centralise approach is better and efficient than decentralize approach towards collection and treatment. But results will surely compare both the options thoroughly. This study will guide department for better decision making and if not for this scheme, will guide for upcoming ones.

REFERENCES

- [1] Mr. May A. Massoud, Akram Tarhini and Joumana A. Nasr have published a research paper in Journal of Environmental Management (Pg 652-Pg 659), and title of the paper was 'Decentralised approaches to wastewater treatment: Applicability in developing countries'.
- [2] Mr Guleda Onkal and Ebrahim Demir have published a research paper in Journal of Environmental Management 2006 (Pg 357-Pg 363), and title of the paper was 'Cost analysis of alternative methods for waste water handling in small communities'.
- [3] Prof. Ahmed Fadel have published a research paper in Forth International water technology conference, IWTC 99 Alexandro Egypt (Pg 652-Pg 659), and title of the paper was 'Low cot Technologies for water treatment and waste water collection and treatment'.
- [4] Mr Deulaye Kone and Martin Strauss have published a research paper in Research Gate (Pg 2-Pg 8), and title of the paper was 'Low cost options for treating faecal sludges (FC) in Developing countries-challenges and performance'.
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