Comparative Case Study of Decentralized Sewage Treatment Plant To Improve The Quality of Centralized STP

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Abstract- *Lucknow is the capital of Uttar Pradesh, it is the fastest growing central city.The area of Lucknow city is 2528 km2,covered the area north Sitapur and Hardoi. The study was done to evaluate the quality of centralized STP as compare to decentralized, which have a fixed controlled area. In Lucknow there are two STP exist, one is located in Bharwara whose capacity is 345 MLD, used as centralized STP for Lucknow city and the second one is located in Daulatganj, capacity of 56 MLD used as specific or fixed area (decentralized).*

Keywords- Decentralized, Centralized, Lucknow, Sewage, STPs Treatment.

I. INTRODUCTION

In the past situation the sewage was less polluted as compare to present situation in the capital of Uttar Pradesh (Lucknow). Due to increasement of population in Lucknow, an average domestic consumption of water increased. As per IS:1171-1971 average domestic water demand is 135 lpcd (litre/capita/day). At the present time population of lucknow is as per provisional reports of Census India, population of lucknow in 2011 is 2817105. In whole city of Lucknow sewage is generated around 500 MLD and it separated into four sewerage area, its further divided into zone namely 1st, 2nd, 3rd and 4th sewerage districts. This sewage is treated on various centralized STP (Bharwara, 346 MLD) and other Daulatganj STP (56 MLD) used as decentralized STP for fixed area of Chowk, Hardoi Road, Cambell Road, Dubagga.

These STPs are based in two different technology, first one is Bharwara based on (UASD) upflow Anaerobic Sludge Blanket and other one is Daulatganj STP based on FAB (Fluidized Aerobic Bioreactor), it was implemented by the Gomti action plan phase I .The whole sewage network of lucknow city have 26 drains which carry the raw sewage. Out of 26 sewer lines, four sewer lines are direct connected to Daulatganj STP and remaining attached with Bharwara. Due to large number of sewer lines attached in Bharwara, burden is more in this STP and various difficulties are faced like (sewage blockage overflow, maintenance etc.) to the treatment of sewage. To resolve the problem of centralized STP (Bharwara STP) to overcome the burden of centralized STP a decentralized STP comes into role names Daulatganj STP (56 MLD) for fixed area.

The treatment of sewage is done by three steps that is primary, secondary and tertiary.

The first unit of treatment plant is known as primary treatment its include the screening chamber, grit removal process and sedimentation of dissolved particle, during primary treatment waste water is temporarily held in mentioned tank, where heavier solid settle down while lighter solids flow to the surface and removed by screening process and remaining liquid is discharged in secondary treatment.

Secondary treatment consist the removal of soluble organic matter, the liquid from primary treatment now headed to trickling filter which removed biodegradable organic matter including passage of air to the sewage, which allows microbes to breakdown the pollutants in the presence of air , the remaining liquid is forwarded to the tertiary treatment.

The tertiary treatment the last stage of treatment unit where the aim of this treatment to enhance the quality of water by removal of virus, bacteria and other inorganic compound after the completion of tertiary treatment , the treated water can be reuse for various objective.

II. BASIC STUDY

It has been discussed that Lucknow city consist of two main STP as show in figure.1, the study has been declared the immediate need of STP in the Bharwara zone to overcome the burden of Bharwara STP.

As per the need of STP for further area two STP are proposed for remaining area of Gomti side and Amausi, Sarojini Nagar.

DIST.	NAME OF STP	LOCATION	CAPACITY	STATUS
I	Daulatganj	East	56 MLD	Functional
II	Khwajapur	Amausi and Sarojini Nagar	108 MLD	Proposed
III	Bharwara	Trans Gomti side	345 MLD	Functional
IV	Mastemau	Remaining side Gomti	270 MLD	Proposed

Fig.1 Lucknow sewerage master plan

Study Area:

The study area is bounded to STP Bharwara Trans Gomti side including Indira Nagar, Gomti Nagar and Sitapur road area conveying sewage to Bharwara STP who is commissioned under Gomti Action Plan phase II and in process of establishment.

The data collected from STP office is useful to analyze rather the treated water for useful purpose.

The result obtain from the aerial survey with the help of satellite image of the plant.

Fig. 2 satellite image of plant Bharwara Lucknow

III. MATERIAL AND METHODOLOGY

The result collected from the both primary data collected by personal survey and other from CPCB (Central Pollution Control Board) . After documentation of available data decentralized technique where feasible for detailed monitoring and evaluation of the STP. Sewage originated from small area having population range from 1000 – 5000 and treating a sewage flow less than 5 MLD. The decentralize treatment plant based on different technology: Extended aeration (EA), Moving Bed Bioreactor (MBBR) etc.

In Bharwara STP is based on Up-flow Anaerobic Sludge Blanket Reactor technology (UASB) which is cover the major area of Lucknow city.

In other Daulatganj STP is based on FAB (Fluidized Aerobic Bioreactor) worked as decentralized for a fixed region.

IV. RECOMMENDATION

The whole case study of STP for the confined region of lucknow city the author view collectlocal data and analyzing and try to resolve the existing problem of centralized STP by adopting the best approach of decentralized STP for enhance the quality of treated sewage.

The author also recommended to adopt the decentralized STP for the future, so that improve the quality of treated sewage for a newly developed area, society, township etc.

The below stated table can help us to understand the advantage and importance of adopting decentralized approach

FACTOR	CENTRALISED	DECENTRALISED
Area Coverage	Large (whole city)	Small (specific area)
Network	Huge	Small
Space Requirement	Large (to accommodate large equipment and tanks due to heavy load)	Small (due to light load)
Operation and Maintenance	Full time staff requirement at plant	Can be observed remotely, are less demanding
Storm Water Control	Less due to huge network	More control on storm water
Expansion	Tough (requires high cost, more complex)	Easy (requires low cost and is less complex)
Blockage	Higher	Low

V. FUTURE PLANT OF STP

The above study related to decentralized STP is best suited for effective treatment of sewage for small community, in future developing city like Lucknow, we should adopt the decentralized approach for better management of waste water and its reuse.

VI. CONCLUSION

A From the previously comparison between centralized and decentralized STP, we must adopt decentralized approach (STP) for the developing city, the currently working STP Bharwara and Daulatganj STP is working well, but the efficiency of Daulatganj STP is higher than the Bharwara STP.

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