



The Impracticality

Of

Retrospective STP & Dual-Piping Implementation

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BACKGROUND & CONTEXT

BWSSB issued a notification on 3rd March 2016 (No.: BWSSB/EIC/CE(M)/16172/2015-16), mandating modular Sewage Treatment Plants (“STP”) and dual piping in residential buildings with 20 or more houses / apartment units, with retrospective effect. The specific extract from the notification reads as follows:

“Any Owner or occupier of an existing buildings consisting of twenty or more houses or apartments or flats within the Board jurisdiction shall provide dual piping system and modular sewage or grey water treatment plant (STP/GWTP) within its premises, within the date specified by the Board. Only treated water from the STP/GWTP installed within its premises shall be used for toilet flushing purposes after the date specified by the Board.”

The notification was passed without any public consultation, technical analysis or opinion taken from relevant technical experts. The notification & subsequent imposition of penalties imposed by BWSSB on apartment complexes has got apartment associations up in arms, due to the extreme impracticality & unfair nature of the same.

This document seeks to set out some key aspects relating to the notification, including the following:

1. Role of BWSSB
2. Impracticality of retrospective STP & dual-piping implementation covering
 - a. *Space Constraints*
 - b. *Safety Issues*
 - c. *Heavy Financial Burden*
 - d. *Environment & Health Hazards*
 - e. *Negligible Incremental Benefits*
 - f. *Lessons from existing STPs*
3. Best Practices
4. Most Efficient Solution
5. Recommendation

ROLE OF BWSSB

The charter of Bangalore Water Supply & Sewerage Board (“BWSSB”) is to provide water supply & sewage treatment services to all residents in all areas of Bengaluru city.

As per the Bangalore Water Supply And Sewerage Act, 1964 (“BWSSB Act”) under which BWSSB has been constituted:

“An Act to make provision for water supply, sewerage and sewage disposal in Bangalore Metropolitan area and for matters connected therewith. WHEREAS it is expedient to make provision for water supply, sewerage and sewage disposal in Bangalore Metropolitan area and for matters connected therewith;”

Not only does the BWSSB Act mandate BWSSB to provide basic civic amenities like water supply & sewage disposal, a Central Pollution Control Board (“CPCB”) notification to Karnataka State Pollution Control Board (“KSPCB”), dated 21st April 2015, reads as follows:

“State Pollution Control Board shall make mandatory for local / urban bodies to set up a sewerage system for sewage collection, underground conveyance, treatment and its disposals to cover the entire local / urban area to bridge the widening treatment gap.”

The same has been reiterated by KSPCB in its notification dated 5th December 2015, to all urban local bodies of Bangalore as well as the Chairman of BWSSB.

Clearly, it is the responsibility of BWSSB to provide a proper system for sewerage collection, underground conveyance, treatment & disposal of the same, covering not just some segments of population, but to the entire urban population. Any notifications issued to any type of consumers should be in the nature of complementing the basic services to be provided by BWSSB and cannot become a substitute or replacement for what it needs to do.

Instead of working towards making a sewerage system available to all consumers, BWSSB, through its notification, seeks to absolve itself of providing the service and shifts the onus of managing the same to a set of consumers (apartments). It is relevant to note that BWSSB imposes sanitary charges to its consumers, including apartment complexes, which is the charge related to sewage disposal service to be provided by BWSSB to its consumers.

IMPRACTICALITY OF RETROSPECTIVE STP & DUAL PIPING IMPLEMENTATION

BWSSB has passed the notification mandating apartments to implement STP & dual-piping with retrospective effect, without engaging in any public consultation or technical analysis relating to the feasibility or practicality of the same. At a very fundamental level, thousands of apartment complexes having to implement STP & dual-piping with retrospective effect is practically infeasible for the following reasons:

SPACE CONSTRAINTS

- * A properly constructed STP requires a set of sumps built under the ground together with pumps, pipes & filters set above the ground for efficient management & maintenance. Many existing apartments in Bengaluru city, particularly the older ones, do not have sufficient space above the ground to have the system, which is essential for on-going maintenance.
- * Apartments built on pillars with ground floor parking & flats in higher levels are common in Bangalore. In such cases, even the underground sumps are not practically possible since the pillars could impede the underground digging.
- * The relatively newer apartments have had to encroach on existing space to make provisions for rain water harvesting, waste segregation, composting etc. Further encroachment of common areas like children's play area, garden, swimming pool, parking etc., if available, may not be a practical & socially acceptable solution.

SAFETY ISSUES

- * Apartments built on pillars with ground floor parking & flats in higher levels are common in Bangalore. Digging the ground in such cases may structurally damage the building, making it unsafe.
- * Retrospective dual piping may cause structural damages to some buildings, either due to the age of the building or due to design / engineering constraints, making it unsafe.

HEAVY FINANCIAL BURDEN

- * Overall cost of STP and dual piping will be prohibitive & existing apartments will not be able to afford the high capex required.
- * A 100 KLD STP, suited for a 150-flat apartment, will approximately cost Rs. 40 - 45 lakhs, if constructed above ground, open to sky.
- * In an existing apartment complex, neither is it advisable nor is it fair to build an open STP in front or under the balconies of one or more residents. Hence, an underground STP room has to be constructed (if space can be found) to house the STP tanks, which will be an additional cost of nearly Rs. 80 - 90 Lakhs for a room of size 15 m x 7.5 m x 5.8 m required to fit the STP.
- * Dual piping would cost another Rs. 20 - 25 lakhs, approximately Rs. 18,000 to 25,000 per flat.
- * The overall cost for a 150-flat apartment would be well in excess of Rs. 1 cr, which will be prohibitively high for existing apartment residents.
- * In addition, the maintenance cost of running an STP could be about Rs. 800 per month for every flat owner in a 150-flat apartment complex. (Detailed Workings given in Annexure - I)
- * Even for STPs in new apartment complexes getting constructed in the future, from a cost-benefit perspective, it would be economically viable only for apartments with 150 units & more, to implement an STP & dual piping system, and only if above the ground / open to sky.

ENVIRONMENT & HEALTH HAZARDS

- * Installing & operating STPs require specialized skills, which is generally in short supply & which would not be available to all apartments.
- * If the sewerage & waste is not handled properly in an STP in an apartment, it poses serious health & environmental issues not just for the residents of that apartment, but for the entire neighborhood too.
- * Implementing, monitoring & enforcing design, engineering & operating standards across thousands of STPs in the city, is extremely impractical.
- * A multitude of STPs built haphazardly across Bengaluru city in order to comply with BWSSB's retrospective ruling could lead to very serious & grave environment / health issues.

NEGLECTIBLE INCREMENTAL BENEFITS

- * There is absolutely no incremental value for apartment complexes that are already connected to the existing sewerage system of BWSSB, to retrospectively implement an STP & dual piping system. On the contrary, any surplus treated water let out into the sewerage system, will make BWSSB's own centralized STPs inefficient since their STPs are designed for higher loads.
- * The argument of apartments recycling their sewerage water reducing fresh water demand also does not hold good since the untreated sewerage water let out into sewerage system by apartment complexes are ultimately treated at centralized STPs and further reused.
- * Large apartment complexes which find it worthwhile from a cost-benefit perspective have already implemented STPs.
- * Hence, there is negligible or very little incremental benefit expected to accrue from such an initiative even if it were to be practically possible.

LESSONS FROM EXISTING STPs

- * Bangalore already has over 2,000 STPs of various sizes and capacities constructed after 14th September 2006, pursuant to the EIA Notification of the MOEF, New Delhi.
- * A lot of these STPs are dysfunctional to various degrees due to the technical complexity as well as the lack of availability of skilled manpower.
- * Neither KSPCB nor BWSSB has been able to monitor or enforce compliance given the number of STPs and this has led to a situation where a few STPs are already defunct and discharge untreated sewage to lakes, storm drains etc. The addition of a few thousand more STPs will further compound the problem of compliance & monitoring.

BEST PRACTICES

- * In any urban agglomeration, it is extremely important for a nodal civic agency to manage water supply & sewerage covering the entire area & its population.
- * Once all the consumers have access to sewerage drains to dispose their sewerage, the most efficient way to manage the same is to get it treated through centralized STPs, which can then be reused / recycled or let out safely into lake / water bodies.
- * Given the hazardous nature of sewerage, it is of utmost criticality that it is managed through a few large centralized STPs which can be easily managed & monitored, rather than through thousands of smaller & diffused STPs which can pose a serious environmental & health hazard.
- * Globally accepted best practices are to build centralized STPs away from residential areas and centrally manage them through specialized agencies.
- * Any notification or ruling issued by the civic agency to consumers should be in the nature of getting consumers to complement what it does and cannot be a replacement or substitute for what it should be doing!

MOST EFFICIENT SOLUTION

- * It is absolutely imperative for BWSSB to first provide sewerage disposal facility through sewerage drains for all consumers in Bangalore including apartment complexes.
- * BWSSB should get all its STPs to running condition so that it can properly treat all the sewerage which can then be subsequently deposited in lakes / water bodies, which can help improve ground water levels or alternatively can reuse / resell the treated water for non-potable use.
- * If BWSSB believes that the load on the sewerage system is increasing, then it can consider mandating new apartments to be constructed above a particular threshold (say 150 units & above), to implement STP & dual-piping system on a prospective basis. This can help in managing the load that comes into the sewerage system.

RECOMMENDATION

The following steps are recommended to BWSSB:

1. Withdraw the notification mandating apartment complexes with 20 units & above to implement STP & dual piping system retrospectively
2. Engage in discussions with technical experts to understand the practicality / feasibility of implementing STP & dual-piping system with retrospective effect for apartments of any size
3. Engage in a dialogue with apartment associations to understand their points of view & concerns relating to this issue
4. Work with technical experts, academia & urban planning experts to find solutions that address the problems facing Bangalore relating to water availability & sewage disposal

Bangalore Apartments' Federation is committed to work with BWSSB as well as the Government to work on the above points on a pro-active basis, with a view to finding short-term as well as long-term solutions to this issue.

ANNEXURE - I

OPERATIONAL & MAINTENANCE COSTS FOR A 100 KLD STP

The projected energy consumption & chemicals consumption for a 100 KLD STP using conventional extended aeration biological treatment system is provided in the table below. All projections are at full load (100 KLD):

1. ENERGY

Sl.	ITEM	NO.	KW, CONNECTED	KW, WORKING	No. HRS/DAY	ENERGY KWH/D
1	Raw sewage Lift pumps	02	2.25	1.1	22	24
2	Air blowers	02	11.25	5.6	24	134
3	Filter feed pumps	02	3.0	1.5	16	24
4	Chlorine dose pump	01	0.1	0.1	20	2
5	Filter press feed pump	01	1.125	1.125	5	6
6	Exhaust / Ventilation	02	3.0 (estimated)	3.0	24	72
		TOTAL			--	262

Energy cost @ Rs. 6 per KWH = Rs. 1600/- per day

(Locating the STP in the basement contributes to an additional energy cost of approximately Rs. 430/- per day or roughly 25 % of the daily operating energy cost)

2. CHEMICALS

The only chemical envisaged to be used in the STP is Sodium Hypochlorite for disinfection of treated water. At a nominal dosage rate of 3 PPM and Hypo available at 10 % strength, the total Hypo requirement per day is projected at 3 Kg/day.

Chemicals cost per day @ cost of Hypo at Rs. 12 – 13 / Kg = Rs. 40/- per day

3. SPARES, AND OTHER CONSUMABLES

Approximate budget of Rs. 3,000/- per month, i.e., Rs. 100/- per day

4. OPERATING MANPOWER

AMC Cost of Rs. 65,000/- per month, i.e., Rs. 2,200/- per day

5. ANNUAL MAINTENANCE COST

Overhauling of air blowers, filters, tanks cleaning in STP of Rs. 75,000/- per annum, i.e., Rs. 200/- per day

OVERALL SUMMARY OF COSTS

ITEM	Cost per day (in Rs.)
Energy	1600
Chemicals	40
Manpower	2200
Spares	100
Annual Maintenance	200
Total Operating Cost / day	Rs. 4140

NOTE: The above does not take into account amortization of capital costs, cost of delivery of sewage to the STP, cost of disposal of treated water from STP etc.

Based on the above, operating an STP could add a burden of more than Rs. 800 per month for every flat owner in a 150-flat Apartment Complex.