

# Performance Evaluation of Sewage Treatment Plants in Central Zone



Central Pollution Control Board  
Zonal Office-Bhopal

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## Executive Summary

A major problem in urbanized areas is the collection, treatment and disposal of domestic wastes. Because large volume of sewage is generated in many cities/ towns and the waste is not treated adequately and disposed off in the open drains which flows downstream and mixes in water bodies. The intensive use of ground water and the large quantity of wastewater generation in modern society often pose a threat to ground water quality. Therefore it is very much essential to treat the domestic wastewater in proper manner by installation of adequate capacity sewage treatment plants (STPs) to prevent the contamination of ground water & surface water bodies etc.

Madhya Pradesh and Rajasthan state governments have 78 no. of operational/non-operational/under construction/proposed STPs. *As on today, there is no municipal installed Sewage Treatment Plant (STPs) exist in Chhattisgarh state.*

In Madhyapradesh State, under various schemes like National River Conservation Plan (NRCP), Bhoj wet land project, Betwa river conservation project STPs in 9 cities were constructed. In Capital City **Bhopal** there are 07 operational STPs of 80.18MLD total treatment capacity. Most of them are based on Waste Stabilization Pond/oxidation pond treatment technology, its treated wastewater got discharged in local drains which finally meets river Betwa. In **Indore** city, 02 STPs based on Upflow Aerobic Sludge Blanket (UASB) technology of total 90MLD capacity are in operation. There are 02 STPs in **Ujjain** of total 105MLD capacity However, only one STP of 53MLD capacity established at Sadaval village, Ujjain based on Kernal technology was operational. In **Vidisha** city, Kernal technology based 7.2MLD STP is in operation. At, Laltipara, **Gwalior** STP of 50MLD capacity based on Waste Stabilization Technology is in operation. Highly agglomerated city, **Jabalpur** has only one STP of 0.15MLD on Gwarighat.

*The organic load i.e. BOD removal efficiency was found maximum upto 85% at Oxidation Pond technology based STP of 16.7MLD capacity at Badwai, Bhopal. Whereas, poorest organic load removal percentage was upto 1.5% which was at Gondarmau, Bhopal oxidation pond based STP. Other than, Gondarmau STP all STPs of Madhyapradesh state are complying the discharge standards.*

In Rajasthan State, under Rajasthan Urban Infrastructure Development Project (RUIDP) funded by the Asian Development Bank (ADB) total **61 STPs** in 30 cities/towns of **842 MLD** capacity are proposed. Out of which, 14 STPs of six major cities i.e. Jaipur, Jodhpur,



Udaipur, Bikaner, SawaiMadhopur and Bhilwara are included. Along with this, 02 STPs at Kota & Rajasamand are ready to commission soon.

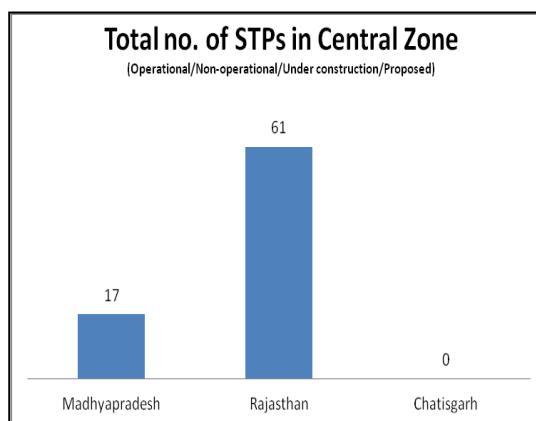
There are 08 operational STPs in capital city, **Jaipur** of 235MLD capacity based on Activated Sludge Process (ASP) & Moving Bed Bio Reactor (MBBR) treatment technology. In **Jodhpur** city, two STPs are in operation at Salawas (50MLD capacity of ASP technology) & Nandari (20MLD capacity of Oxidation ponds) and one more 50MLD STP is proposed at Salawas. In Kewara village, **Bhilwara** 10MLD (5.5+4.5MLD) Sequential Batch Reactor (SBR) technology based STP is in operation. One STP each based on waste stabilization ponds (WSPs) and oxidation ponds (OPs) are operational at **SawaiMadhopur** (10MLD) & **Bikaner** (20MLD) respectively. There is one 20MLD MBBR technology based STP is in operation at Eklingapura, **Udaipur**.

*The organic load i.e. BOD removal efficiency was found maximum upto 97% at Moving Bed Bio Reactor (MBBR) treatment technology based STP of 1MLD capacity at Jawahar Circle, Jaipur. Whereas, lowest organic load removal percentage was upto 80-82% which was at Delawas-I & Delawas-II ASP technology based STP along with STP of Amer road. Other than, Delawas-I & Delawas-II and Amer road STP, all STPs of Rajasthan state are complying the discharge standards.*

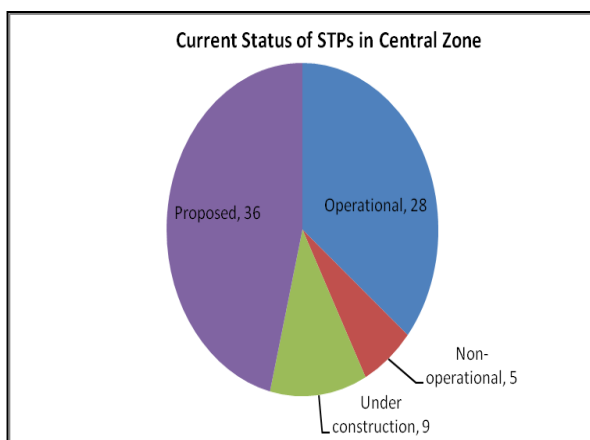
Majorly it was observed that, cities have no proper sewerage network to collect entire sewage. Due to inadequate collection system major part of untreated sewage discharged directly/indirectly in open drains which lead to surface water bodies. The partly collected wastewater has been treated in STPs and the majority of STPs are operating without obtaining consent to operate under Water (Prevention & Control of Pollution) Act, 1974 from respective SPCBs. All the STPs have by-pass arrangement. The oxidation ponds and waste stabilization ponds were in operation with a high retention time and lot of sludge deposited in it but these ponds were not cleaned regularly. These ponds do not have proper path/approach road and surrounding are covered with grass/ bushes. The overall maintenance of oxidation ponds & waste stabilization ponds was observed to be very poor. Proper records are not being maintained for the operation of STPs like inlet flow, outlet flow, sludge generation etc by the STP operators. It was observed that reuse/ recycling of treated wastewater is not planned yet. The treated sewage is being discharged in the nearest wastewater drain. Chlorination is not being done at outlet of any of the STP for control of Total/Feacal Coliforms.

## 1. Introduction:-

In compliance of CPCB, head office, Delhi letter no. A-19014/43/06-MON/1271 dated 06.05.2015 through which Zonal Office; Bhopal had directed to conduct the performance evaluation of all the operating STPs in Central Zone i.e. Madhya Pradesh, Chattisgarh and Rajasthan. The officials from CPCB, Zonal Office, Bhopal have inspected **23 STPs** in Madhyapradesh & Rajasthan during June–Sept 2015. There are no municipal STPs installed in Chhattisgarh state.



There are **78** STPs in central zone in which **28** are in operation (14 each in Madhyapradesh & Rajasthan), **05** are non-operational, **09** are under construction and 36 are in proposed stage. Out of 28 operational STPs, the monitoring work has been completed in 23 STPs. The monitoring of remaining 05 STPs shall be completed during next two months.



*The state-wise detailed inspection reports including analysis results, duly filled formats, photographs, observations and suggestions are as follows:-*

### i. Madhya Pradesh :-

To reduce the water pollution as well as to protect surrounding water bodies, Madhya Pradesh Government had constructed the sewage treatment plants to treat the sewage generated in the urban areas in Madhya Pradesh under various schemes like National River Conservation Plan (NRCP), Bhoj wet land project, Betwa river conservation project etc. The STPs are installed in **9 cities** for the treatment of sewage in which 3 cities/ towns STPs were not in operation i.e Burhanpur, Nagda and Keolari. CPCB, Zonal Office Bhopal has visited the STPs located in various cities in state and collected the wastewater samples. Status of STPs in MP state is presented below.

- **STPs constructed under National River Conservation Plan (NRCP)**

It was informed that PHED do not have sufficient funds and skilled manpower for the running of these plants. PHED has requested the Commissioner Municipal Corporation to take over the charge of project. It is informed that minimum cost for O& M would be in crore per annum and Municipal Corporation had no fund provision in their budget to run the plants. However, responsibility of operation and maintenance of STPs lies with the local bodies, as per the policy framed during the inception of project. As per the GOI policy under the NRCP project the local body / Municipal Corporation has to take responsibility for the Operation and maintenance of the STPs.

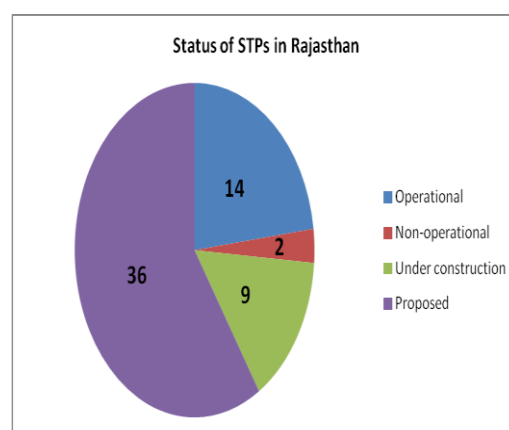
- **STPs constructed under Bhoj wetland project**

STPs constructed in Bhopal under this project are being operated by PHED itself. These STPs are irregularly operational, responsibility of their operational & maintenance is in hands of non skilled persons due to which conditions of plant are very poor.

- The condition of STPs constructed by State government are similar as of the STPs constructed under Bhoj wetland project.

## ii. **Rajasthan:-**

Government of Rajasthan is in process of installation of **61 STPs** in 30 cities/towns of Rajasthan with a total treatment capacity of **842 MLD** under Rajasthan Urban Infrastructure Development Project (RUIDP) funded by the **Asian Development Bank (ADB)** it includes operational **14 STPs** of six major cities i.e. Jaipur, Jodhpur,



Udaipur, Bikaner, SawaiMadhopur and Bhilwara. In addition to the above Rajasthan Government has already constructed 02 STPs at Kota & Rajasamand which are ready to commission. There are **09 STPs** under construction in 6 cities/towns and **36 STPs** proposed in 22 cities/ towns under various projects.

- **In Jaipur city:** - Conventional STPs at Jalmahal of 27 MLD capacity for treating the sewage from Bramhapuri area. Delawas unit-I&II (2x62.5 MLD) for treating the

Southern Jaipur wastewater including Sanganer Industrial wastewater, Jaisinghpura Khor (50 MLD capacity) for treating the sewage from Jaipur city and 30 MLD STP at Gajodharpura for treating the Western Jaipur wastewater. The STP was constructed by RUIDP and thereafter handed over to JMC (Jaipur Municipal Corporation) for operation. The Jaipur Development Authority has also constructed 1MLD STP each at Jawahar circle, Ramnivas garden & Vidyadhar Nagar and 7.5 MLD capacity TTP (Tertiary Treatment Plant) attached to 27 MLD plant at Jalmahal. The plant was being run by RUIDP and treated water is released to Jalmahal. Further two STPs are under construction and two proposed in Jaipur city.

- **In Jodhpur city**, two STPs are in operation at Salawas (50MLD capacity ASP technology) & Nandari (20MLD capacity oxidation ponds) and one more 50MLD STP proposed at Salawas.
- **In Bhilwara**, one 10MLD (5.5+4.5MLD) capacity Sequential Batch Reactor (SBR) technology STP operational at Kewara village.
- **In Sawai Madhopur & Bikaner**, one STP each of waste stabilization ponds (WSPs) and oxidation ponds (OPs) installed respectively.
- **In Udaipur** 20 MLD capacity MBBR technology STP installed at Eklingapura which is in operation.

### **iii. Chattisgarh:-**

As on today there is no municipal Sewage Treatment Plant (STPs) exist in Chhattisgarh state. The untreated sewage is being discharged in to the local Nallah and finally leads in to the water bodies. Some large and medium scale industries in Chhattisgarh state have their own sewage treatment facilities for treating their sewage generated from colony and industrial establishment. M/s Bhilai Steel Plant has their own Sewage Treatment Plants (STPs) at Bhilai and Durg. It was also informed that M/s Bhilai Steel Plant is planning to install 30MLD capacity conventional STP to treat the wastewater coming from their colony.

## **Common observations:-**

1. The population of each city / town has been increasing exponentially. At the same time the water consumption in residential and commercial activities has increasing day by day as a result the wastewater generation also increasing but the wastewater treatment plants have not installed accordingly. The total wastewater generation will be much more than the existing wastewater treatment capacity of the STPs. There is lot of gap between the wastewater generation and treatment. The treated /untreated wastewater mixing in to the water bodies which inturn causing ground/ surface water contamination.
2. The existing STPs are constructed under various schemes like National River Conservation Plan (NRCP), Bhoj wet land project in Madhyapradesh and ADB & JNNURM etc in Rajasthan.
3. Cities have no proper sewerage network to collect entire sewage. Due to inadequate collection system major part of untreated sewage discharged directly/indirectly in open drains which lead to surface water bodies or percolating in subsoil.
4. Majority of STPs are operating without obtaining consent to operate under Water (Prevention & Control of Pollution) Act, 1974 from respective SPCBs.
5. It was observed that the agencies/department engaged in Operational & Maintenance of STPs is suffering of financial crisis and skilled manpower. Due to lack of skilled manpower with the local bodies/ state government, the operation & maintenance of conventional activated sludge process (ASP) based STPs are given on contract to the consultants.
6. The ASP based STPs have provided sludge drying beds (SDBs) but there was no proper storage facility provided for storing the dried sludge from the sludge drying beds. The STP operators informed that the dried sludge has been taken by the nearby farmers and used in the plant premises as manure but proper record is not being maintained.
7. It was informed by the operators that about 20% of the industrial effluent from industrial activities in the cities/ towns also mixing with sewage but the STPs are not designed for it. Due to the high hydraulic load from domestic effluent and inorganic load from industrial & commercial activities the STPs are not meeting the norms prescribed by pollution control boards.
8. Majority of STPs have no arrangements to measure inlet and outlet flow. Few plants provided flow meters at the inlet to measure flow but none of them found in working condition. As per some operators the flow has been calculated based on the pump running hours. During the visit it was observed that about 50% of wastewater was found by-passing in to the drain and 50% taking for treatment.

9. All the STPs have by-pass arrangement. It is observed that STPs kept operational during peak flow of sewage received in day time and during the night hours (lean flow) the sewage discharged through by-pass arrangements. It was observed that during rainy season all the effluent has been by- passing along with storm water.
10. The oxidation ponds and waste stabilization ponds were in operation with a high retention time and lot of sludge deposited in it but these ponds were not cleaned regularly as a result their holding capacity (sewage retention time) are being reduced day by day which ultimately causes adverse effect on treatment efficiency of STP.
11. The oxidation ponds & waste stabilization ponds do not have proper path/ approach road and surrounding are covered with grass/ bushes. More importantly some STPs do not have even lighting arrangement and fencing/ boundary wall. The overall maintenance of these oxidation ponds & waste stabilization ponds was observed to be very poor.
12. The treated sewage of most of the STPs is not being monitored & analysed on regular basis for assessment of degree of treatment.
13. Proper records are not being maintained for the operation of STPs like inlet flow, outlet flow, sludge generation etc by the STP operators.
14. It was observed that reuse/ recycling of treated wastewater is not planned. The treated sewage is being discharged in the nearest wastewater drain. Chlorination is not being done at outlet of any of the STP for control of Total/Feacal Coliforms.
15. DG set are not provided in many STPs for backup power to cop-up the power in emergency for operation of the biological system without any interruption during power failure.



## **Common recommendations:**

1. STPs which are in operation without obtaining Consent to Operate needs to obtain consent from respective SPCBs without any further delay.
2. The sewage collection network and sewage pumping arrangement shall be upgraded /strengthened for collection and treatment of sewage of entire city.
3. The by-passing of untreated sewage from pumping stations and STPs shall be stopped immediately introducing some alternate arrangement of storage of sewage during peak hours and upgrading the capacity of pumping stations.
4. The primary treatment units should be operated properly and rags/grit/coarse material shall be removed regularly for improving the treatment efficiency. The collected material should be stored at a designated place and disposed as per the rules.
5. The state government shall plan for establishment of new STPs in the areas which have not covered in existing STPs.
6. State government should make adequate budget provision for recurring costs such as running & maintenance of STPs. The authorities responsible for collection and treatment of sewage may also be directed by state government to ensure regular operation and maintenance of STPs and utilization of treated sewage in plantation, gardening, recycling etc after proper disinfection. The responsibility of concerning officers/ staff may also be fixed in case of violation of norms.
7. Proper records should be maintained for inlet and outlet flow by installation of flow measuring devices/ arrangement.
8. The Waste Stabilization Ponds/oxidation ponds should be cleaned/ de-sludged at regular interval along with removal of weeds, floating materials and grass for improvement of the efficiency of STP.
9. The skilled manpower shall be engaged for operation of STPs and quality of raw and treated sewage shall be analyzed for controlling parameters on regular basis.
10. To develop green belt along the STP boundary and make internal roads pucca in the STP premises with fencing & lighting arrangements.
11. The sewage pumping stations should be operated continuously to stop overflowing of sewage during peak hours.

12. The new STPs having adequate capacity may be also be planned to cater the need of treatment of excess sewage which is not being treated through existing STPs for protection of aquatic environment and human health as well.
13. As, the quality of the treated wastewater was found well within the discharge limits in some STPs therefore, concerning agencies shall explore the possibility of reuse of treated wastewater after disinfection for construction, gardening, industrial cooling purposes etc instead of letting in to the same drain. The STPs should construct holding tank of sufficient capacity for storage of the treated wastewater.
14. The STPs should construct sufficient number of sludge drying beds (SDBs) and maintained them regularly and to store the sludge properly & use as manure by the farmers.
15. Adequate chlorine dosing should be ensured in the treated sewage for control of Coliforms in the effluents which are discharging in the water bodies.

## **2. Inspection & Monitoring of STPs in Madhya Pradesh**

### **STPs in Bhopal City**

Scarcity of fresh water is increasing day by day, due to enormous quantity of untreated sewage in every town/ city reaching in fresh water bodies and also percolating in to ground water table as a result the pollution level is increasing in water bodies as well as ground water.

To reduce the water pollution as well as to protect surrounding water bodies, Madhya Pradesh Government has constructed seven sewage treatment plants to treat the sewage generated in Bhopal city under various schemes like Bhoj Wet Land Project, National River Conservation plan etc.

But due to increased urban population & water consumption the quantity of wastewater generation has increased significantly. The sewage network of the Bhopal city is also insufficient therefore the entire sewage is not reaching up to the existing STPs thus these plants are running under capacity.

*The list of STPs inspected along with installed capacity, year of commissioning etc., is compiled at **Table 5**. During the visit; the technical details of STPs were verified and wastewater samples were collected from the inlet and final outlet for performance evaluation. The samples were analyzed as per the standard methods in the Zonal Office Laboratory. The percentage removal and compliance status of monitored STPs are depicted at **Table 6 & Table 7** respectively.*

### **General observations:**

- i. To reduce the water pollution as well as to protect surrounding water bodies, Madhya Pradesh Government has constructed seven sewage treatment plants to treat the sewage generated from Bhopal city under various schemes like Bhoj Wet Land Project, National River Conservation Plan etc.
- ii. The STPs constructed under Bhoj wet land project in Bhopal are being operated by PHED and it was informed that PHED do not have sufficient funds and skilled manpower for running of these plants. No skilled manpower engaged for O&M of these STPs.
- iii. Bhopal city has no proper sewage lines network to collect its sewage therefore entire sewage is not being collected, thus major part of untreated sewage discharged directly/indirectly in open drains which leads to surface water bodies and percolating in subsoil.

- iv. Presently there are 07 municipal STPs established in Bhopal city to treat the sewage. Out of which 04 STPs (Badwai, Gondarmau, Mohali Dhamkheda and Kotra) are constructed under Bhoj Wet land Project funded by Japan Bank of International Cooperation (JBIC), Japan. One STP constructed by state government under National River Conservation plan (Near Ekant Park) & two STPs (Mata Mandir and Bawaria Kalan) were constructed by State Government long back. These STPs are based on oxidation and waste stabilization pond (Anaerobic & Facultative) treatment concept. STP at Mata Mandir is based on attached growth system i.e. Trickling filter treatment technology.
- v. In addition to the above STPs there are three more STPs at Barkhera, Piplani (BHEL) and Hamidia Hospitals with a capacity of 8MLD, 1.25MLD and 0.5MLD respectively. The STPs at Barkhera & Piplani are owned by BHEL and Hamidia STP operated by Hamidia Hospital. These STPs were not monitored.
- vi. It was observed that the PHED official always claims that they have financial crises for O & M of existing STPs (whereas majority of treatment plant are oxidation ponds or waste stabilization ponds, which don't require much financial input for O & M).
- vii. The STPs are spread in a large area at the out skirts of the city. Sewage has been pumped to the individual STPs from various pump houses.
- viii. No plan has been prepared for re-use of treated sewage. The treated sewage was being discharged in to the nearest wastewater drain. Chlorination is not being done at out let of any of the STP for control of Total/Faecal Coliforms.
- ix. The treated sewage of most of the STPs is not being monitored on regular basis for assessment of degree of treatment however it was informed that samples are collected and analyzed occasionally in the PHED State Research Laboratory located at Shyamla Hills.
- x. The Consents under section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 have not obtained from MPPCB for discharge of sewage from outlet of STPs being operated by PHE department. The water consent is not renewed up to date by the authorities for STPs constructed under Bhoj wet land project.
- xi. Proper records are not being maintained for the operation of STPs like inlet flow, outlet flow, sludge generation etc, by the STP operators.
- xii. The oxidation ponds and waste stabilization ponds were in operation with a high retention time and lot of sludge deposited in it but these ponds were not cleaned regularly as a result their holding capacity (sewage retention time)are being reduced day by day which ultimately causes adverse effect on treatment efficiency of STP.

- xiii. The oxidation ponds & waste stabilization ponds do not have proper path/ approach road and surrounding are covered with grass/ bushes. More importantly some STPs do not have lighting arrangement and fencing/ boundary wall. The overall maintenance of these oxidation ponds & waste stabilization ponds was observed to be very poor.
- xiv. It is observed that the PHED staff is looking after the pumping of the sewage but not operation of STP. The concerning staff do not know much about the operation and maintenance of STPs.
- xv. Foul odour observed at all the STPs especially at waste stabilization and oxidation ponds.

### **Results and discussions:**

During the visit samples of inlet and outlet of STPs were collected during 23- 27<sup>th</sup> July 2015 for analysis of pH, TSS, BOD, COD, Ammonical-Nitrogen , TKN, Total Coliforms and Feacal Coliforms as per the standard methods by the officials of Zonal Office Laboratory, Bhopal.

- i. None-of the monitored STPs were meeting the norms w. r. t total Coliforms and Feacal Coliforms.
- ii. The STPs at Mohali Dhamkheda and Kotra are meeting norms w.r.t. pH, TSS, BOD & COD.
- iii. The analysis results of STPs at Mata Mandir, Bawaria Kalan & Ekant Park were found below the limits but by-passing of untreated sewage was observed.
- iv. The STPs at Badwai & Gondarmau were not meeting the norms w.r.t. BOD.

### **Recommendations:**

- i. Consent and subsequent renewals under Water Act, 1974 must be obtained from MPPCB on priority.
- ii. The sewage collection network and sewage pumping arrangement shall be upgraded /strengthened for collection and treatment of sewage of entire city.
- iii. The by-passing of untreated sewage from pumping stations and STPs shall be stopped immediately.
- iv. The primary treatment units should be operated properly and rags/grit/coarse material shall be removed regularly for improving the treatment efficiency. The collected material should be stored in a designated place and disposed as per the rules.

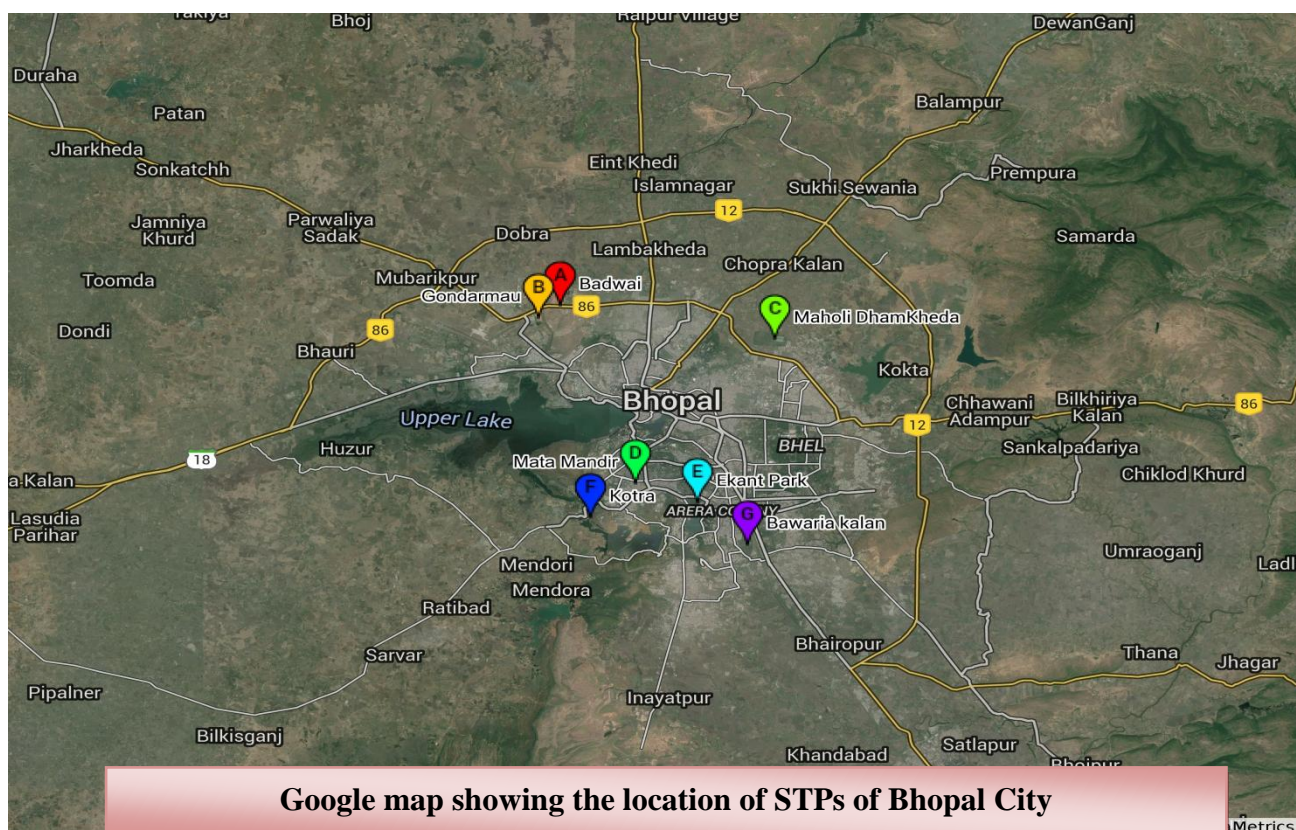
- v. State government should make adequate budget provision for recurring costs such as running & maintenance costs of STPs. The authorities responsible for collection and treatment of sewage may also be directed by state government to ensure regular operation and maintenance of STPs and utilization of treated sewage in plantation, gardening, recycling etc after proper disinfection. The responsibility of concerning officers/ staff may also be fixed in case of violation of norms.
- vi. The state government may plan for establishment of new STPs in this area which are not covered in existing STPs.
- vii. Chlorine dosing for disinfection shall be ensured for controlling coliforms in the effluents which are discharging in the Betwa River, Halali dam, Kaliyasot Dam etc.
- viii. Proper records should be maintained for inlet and outlet flow by installation of flow measuring devices/ arrangement.
- ix. The Waste Stabilization Ponds/oxidation ponds should be cleaned/ de-sludge at least once in year for removal of weeds, floating materials and grass for improving the efficiency of STP.
- x. The skilled manpower shall be engaged for operation of STPs and quality of raw and treated sewage shall be analyzed for controlling parameters on regular basis.
- xi. To develop green belt along the STP boundary and make internal roads pucca in the STP premises with fencing & lighting arrangements.
- xii. The sewage pumping stations should be operated continuously to stop overflowing of sewage during peak hours.



**Table 1: Bhopal STPs monitored and their treatment capacity**

S. No	STP Location	GPS Coordinates	Project installed under	Year of commissioning	Installed Capacity MLD	Technology	Consent status
A	Badwai, Bhopal	N-23°18.091' E-77°22.018'	Bhoj wet land project	2001	16.7	OP	Expired on 31.12.2013
B	Gondarmau, Bhopal	N-23°17.673' E-77°21.558'	Bhoj wet land project	2001	2.36	OP	Expired on 31.12.2013
C	Maholi Damkheda, Bhopal	N-23°17.099' E-77°27.229'	Bhoj wet land project	2001	25.0	WSP	Expired on 31.12.2013
D	Kotra, Bhopal	N-23°13.557' E-77°24.269'	Bhoj wet land project	2001	10.0	WSP	Expired on 31.12.2013
E	Ekant Park, Bhopal	N-23°12.757' E-77°25.345'	NRCP	2008	8.0	OP	Not obtained
F	Mata Mandir, Bhopal	N-23°12.452' E-77°22.799'	MP Govt.	1959	4.56	TF	Not obtained
G	Bawaria kalan, Bhopal	N-23°12.019' E-77°26.656'	MP Govt.	1975	13.56	OP	Not obtained

Note: **WSP**-Waste Stabilization Ponds, **OP**-Oxidation Ponds and **TF**-Trickling Filter



**Table 2: Bhopal STPs and compliance status**

S No	Name of STP	Areas covered	No of pump houses	STP inlet flow in MLD		Treatment system provided	No of ponds/tanks provided		Size of tank/ponds	Treated effluent discharging in to	Compliance status
				Design	Actual		AP	FP			
1	Badwai, Bhopal	Vijay Nagar, Lalgahati Area, Ahmedabad, Sawar Nagar, Halalipur, Bairagarh, Laukhedi, Khanooagaon, Behta, Indira Nagar, New Sehor Naka	07	16.7	10.0	OP	2	2	<u>Anaerobic pond- 1 &amp; 2</u> Size- 70x35m <u>Facultative pond- F-1</u> Size – 379 X 155 m <u>Facultative pond- F-2</u> Size – 62X 190 m	Halali Dam	<b>Not Complying</b>
2	Gondar mau, Bhopal	Tilak Nagar, Panchvati, CTO Area Bairagarh, Kailash Nagar, Devlok Colony, MES Colony, Sarvodaya Colony, 12 Camp, Mathai Nagar	01	2.36	2.0	OP	1	2	<u>Anaerobic pond-</u> Size-14x42X4 m Capacity: 2353 m <sup>3</sup> <u>Facultative pond- F-1</u> Size – 57x122.5x1.5 Capacity: 10473m <sup>3</sup> <u>Facultative pond- F-2</u> Size – 42.25x84.5x1.5 Capacity: 5355m	Halali Dam	<b>Not complying</b>
3	Maholi Damkheda, Bhopal	Vardaman, Ginnori, MLB Collage Area, Banganga, Patra Pump House Area, Kolu Area	06	25	18	WSP	2	3	<u>Anaerobic pond- 2</u> Size-90x60 m. Depth- 4.50 m. Capacity- 24,300m <sup>3</sup> Retention time-01 day <u>Facultative pond-3</u> Size- 330 m x 110 m. Depth- 1.5 m. Capacity- 54,450M <sup>3</sup> Retention time-07 day	Patra Nallah	<b>complying</b>

4	Mata Mandir, Bhopal	South T.T Nagar, Tulsi Nagar, Platinum Plaza	01	4.56	2.25	TF			Trickling filter- 60 ft dia and depth of 7.5 ft Clarifier-35ft.dia.& depth 14 ft. Clari-digester unit- 40 ft. dia. & depth of 26 ft	Shahpura lake	<b>complying</b>
5	Ekant Park, Bhopal	Panchsheel Nallah	Gravity	8	7.6	OP	-	1	Size- 230 x 115.5 m. Area: 26,565m <sup>2</sup> Retention time-07day	Shahpura lake	<b>Complying</b>
6	Kotra, Bhopal	Nehru Nagar, Kotra, Kamla Nagar, Vaishali Nagar, Gandhi Basti	01	10	8.0	WSP	2	3	<u>Anaerobic pond- No. 1</u> for 10 MLD Size- 60 m x 20 m Effective Depth- 40 m. Capacity: 48,000M <sup>3</sup> Retention time-1 day <u>Facultative pond- No. 1</u> for 10 MLD Size- 230 m x 60 m. Effective Depth-1.50m. Capacity- 20700M <sup>3</sup> Retention time-07 day <u>Facultative pond- No. 2</u> for 10 MLD Size- 201 m x 65 m. Effective Depth-1.50m. Capacity- 19597M <sup>3</sup> Retention time-07 day <u>Facultative pond- No. 3</u> for 10 MLD Size- 210 m x 60 m. Effective Depth-1.50m. Capacity- 18900 M <sup>3</sup>	Kaliasot dam	<b>complying</b>

									Retention time-07 day Rock filter-Area- 901m <sup>2</sup>		
7	Bawaria kalan, Bhopal	Habibganj, Manisha Market, Shahpura,	03	13.56	8.0	OP	-	8	<b><u>Facultative pond-</u></b> <b>1 to 8 numbers</b> <b>Size-165 ft x 330 ft</b> <b>(Each)</b> <b>Total Area of</b> <b>facultative ponds :</b> <b>4,35,600 ft<sup>2</sup></b>	Kaliasot River	Complying

**Table 3: Quality of outlet of Bhopal STPs**

S.No	Address of STP's	Date of sampling	pH	TS S	CO D	BO D	NH <sub>3</sub> -N	TK N	TC	FC
1.	Badwai, Bhopal	23.07.2015	7.77	31	83	31	3.04	3.36	TNTC	TNTC
2.	Gondarmau, Bhopal	23.07.2015	7.51	66	183	64	5.02	7.84	TNTC	TNTC
3.	Maholi Damkheda, Bhopal	23.07.2015	8.76	56	62	25	2.73	8.4	TNTC	TNTC
4.	Mata Mandir, Bhopal	23.07.2015	7.24	71	31	13	1.14	7.28	TNTC	TNTC
5.	Ekant Park, Bhopal	27.07.2015	8.1	13	48	7.8	0.31	5.6	TNTC	TNTC
6.	Kotra, Bhopal	27.07.2015	7.60	12	24	6.9	0.45	8.96	TNTC	TNTC
7.	Bawaria kalan, Bhopal	27.07.2015	7.1	4	30	5.2	2.55	14.5	TNTC	TNTC
<b>Prescribed Limits</b>			<b>5.5 -9.0</b>	<b>100</b>	<b>250</b>	<b>30.0</b>	<b>-</b>	<b>-</b>	<b>--</b>	<b>--</b>

Note: All the values are in mg/l except pH. The TC & FC values are in MPN/100ml. At all the monitored locations TC and FC values found as **TNTC (Too Numerous To Count)**.

**Table 4: Performance status of STPs**

S.No	Name of STP	Sampling location	pH	TSS	COD	BOD	NH <sub>3</sub> -N	TKN
1	Badwai, Bhopal	Inlet	6.93	204	458	208	8.23	<b>10.0</b>
		Out let	7.77	31	83	31	3.04	<b>3.36</b>
		% removal	-	<b>85</b>	<b>82</b>	<b>85</b>	<b>63</b>	<b>66</b>
2	Gondar mau, Bhopal	Inlet	6.96	87	194	65	9.58	<b>19.6</b>
		Out let	7.51	66	183	64	5.02	<b>7.84</b>
		% removal	-	<b>24</b>	<b>06</b>	<b>1.5</b>	<b>48</b>	<b>60</b>
3	Maholi Damkheda, Bhopal	Inlet	6.88	79	115	74	7.56	<b>10.6</b>
		Out let	8.76	56	62	25	2.73	<b>8.4</b>
		% removal	-	<b>29</b>	<b>46</b>	<b>66</b>	<b>64</b>	<b>21</b>
4	Mata Mandir, Bhopal	Inlet	6.78	194	86	29	2.79	<b>10.64</b>
		Out let	7.24	71	31	13	1.14	<b>7.28</b>
		% removal	-	<b>63</b>	<b>64</b>	<b>55</b>	<b>59</b>	<b>32</b>
5	Ekant Park, Bhopal	Inlet	7.2	8	30	8.2	0.65	<b>7.28</b>
		Out let	8.1	13	48	7.8	0.31	<b>5.6</b>
		% removal	-	-	-	<b>05</b>	<b>52</b>	<b>23</b>
6	Kotra, Bhopal	Inlet	7.2	29	93	21	1.53	<b>3.92</b>
		Out let	7.60	12	24	6.9	0.45	<b>8.96</b>
		% removal	-	<b>59</b>	<b>74</b>	<b>67</b>	<b>71</b>	-
7	Bawaria kalan, Bhopal	Inlet	8.4	18	66	8.5	0.24	<b>6.16</b>
		Out let	7.1	4	30	5.2	2.55	<b>14.56</b>
		% removal	-	<b>78</b>	<b>55</b>	<b>39</b>	-	-

Note: all values are in mg/l except pH

### **3.0 Details of STPs of Bhopal**

#### **3.1 STP at Mata Mandir, Bhopal**

##### **Observations**

- i. The STP located at Mata Mandir constructed mainly for the treatment of wastewater generated from the government quarters of South T.T Nagar, Bhopal. It was proposed in 1956 at the time of formation of state capital with 1MGD (i.e. 4.56MLD) capacity and commissioned by Hindustan Dorr-Oliver Limited, Mumbai in 1959 with the financial assistance from State Govt. The treatment plant consist screen chamber, grit chamber, clari-digestor, trickling filter, clarifier and sludge drying beds.
- ii. The sewage generated from the New Market, South T.T. Nagar, Mata Mandir and Gitanjali complex areas got treated at this STP. However due to its final discharge in untreated drain, huge quantity of untreated sewage meet Panchsheel Nallah which further treated in STP of Ekant Park.
- iii. The STP authorities have not made provision for separate holding tank for storing the sewage during peak hours. It was observed that the entire treatment unit is working as holding tank and there was no Bio-mass in the trickling filter.
- iv. The arms attached with the trickling filter were found corroded and no sludge was found in sludge drying beds.
- v. The STP has no laboratory facilities for analyses of routine parameters. The samples were sent to PHED laboratory once in a month for the analysis.
- vi. Proper lighting, roads, plantation done at the STP premises. Housekeeping was found good.
- vii. Inlet and outlet samples were collected on 23.07.2015 from STP and the analysis results of the samples are given in Table 3 &4. The values of pH, BOD, COD and TSS at outlet are found to be 7.24, 13 mg/L, 31 mg/L and 71 mg/L respectively, against the prescribed limits of 5.5 -9.0, 30 mg/L, 250 mg/L and 100 mg/L. All the measured values are within the limits. The Total Coliforms and Feacal Coliforms values found to be TNTC (too numerous to count).



## **Suggestions**

- i. The STP authority should obtain the Consent under Water Act, 1974 from MPPCB on priority.
- ii. To handle the peak hours flow, plant needs to construct a holding tank of adequate capacity.
- iii. Laboratory facilities should be developed for testing of untreated and treated effluent quality before discharging in to Shahpura Lake through Panchsheel drain.
- iv. The STP should be upgraded with the existing facility, maintain properly and operate continuously to treat wastewater without bypassing.
- v. To engage skilled manpower in STP operation & maintenance work.
- vi. The treated effluent should be used for gardening, construction etc after disinfection.
- vii. To maintain records for O&M, flow and sludge generation of STP.
- viii. STP was designed long back in 1959 considering that time population and flow of sewage, now population of this area has increased many folds therefore STP shall be upgraded considering population of next 20 year.

### Detailed information of STP Mata Mandir, Bhopal

<b>1.</b>	<b>Name / Location of STP</b>	<b>:</b>	<b>Mata Mandir, Bhopal</b>
<b>2.</b>	Process of Sewage Treatment	<b>:</b>	<b>Trickling Filter</b>
<b>3.</b>	Flow sheet of STP (to be attached)	<b>:</b>	<b>Attached</b>
<b>4.</b>	Designed Capacity / day	<b>:</b>	<b>4.56MLD</b>
<b>5.</b>	Actual Treatment	<b>:</b>	<b>2.25MLD</b> <b>INLET</b> <b>Screening Chamber</b> <b>Grit Chamber</b> <b>Sedimentation Tank</b> <b>Trickling filter (Bio filter)</b> <b>Clarifier</b> <b>OUTLET</b>
<b>6.</b>	Raw Sewage Characteristics	<b>:</b>	<b>CPCB Report</b>
	pH TSS COD BOD NH <sub>3</sub> -N Total Nitrogen (TKN) FC TC		<b>6.78</b> <b>86</b> <b>29</b> <b>194</b> <b>2.79</b> <b>10.64</b> <b>TNTC</b> <b>TNTC</b>
<b>7.</b>	Primary Settling Tank	<b>:</b>	
	Primary Settling Tank Volume M <sup>3</sup> Settling Surface Area M <sup>2</sup> Weir Length (m) Retention Period PST outlet TSS, BOD, COD (mg/l)  Under flow Solids concentration mg/l or % Actual Primary Sludge Production rate (Flow rate M <sup>3</sup> /hr multiplied by hr / day) Availability of Mechanical Scraper		<b>881M3</b> <b>40 feet diameter</b> <b>26 feet depth</b> <b>01 day</b> <b>TSS-64mg/l, BOD-46mg/l, COD-95mg/l</b> <b>10%</b>  <b>Quantity not checked</b> <b>Yes</b>
<b>8.</b>	Aeration Tank	<b>:</b>	<b>Not Applicable</b>
<b>9.</b>	Secondary Settling Tank	<b>:</b>	<b>Not Applicable</b>
<b>10.</b>	A. Activated Sludge Process	<b>:</b>	<b>Not Applicable</b>
	B. UASB	<b>:</b>	<b>Not Applicable</b>
<b>11.</b>	Final Effluent Quantity	<b>:</b>	<b>CPCB report</b>
	pH TSS COD BOD NH <sub>3</sub> -N Total Nitrogen (TKN) FC TC		<b>7.24</b> <b>31</b> <b>13</b> <b>71</b> <b>1.14</b> <b>7.28</b> <b>TNTC</b> <b>TNTC</b>

<b>12.</b>	Sludge Thickener	<b>:</b>	<b>Not Applicable</b>
<b>13.</b>	Sludge Digesters		<b>Not Applicable</b>
<b>14.</b>	Biogas produced, if any and its composition		<b>Not Applicable</b>
<b>15.</b>	Operational status of gas utilization		<b>Not Applicable</b>
<b>16.</b>	Power generation , if any		<b>Not Applicable</b>
<b>17.</b>	Point of treated sewage disposal (river / lake / irrigation / land and disposal / pisciculture / aquaculture / any other)		<b>Anjali complex drain Panchsheel drain Joins Shahpura Lake</b>
<b>18.</b>	Bypass arrangement of STPS, if any		<b>Yes, bypass arrangement from grit chamber to final outlet</b>
<b>19.</b>	Method of Sludge disposal and status (Satisfactory / Unsatisfactory)		<b>Unsatisfactory</b>
<b>20.</b>	Operation and maintenance of Sewage Treatment Plant (Satisfactory / Unsatisfactory)		<b>Satisfactory</b>
<b>21.</b>	Agency for operation and maintenance of Sewage Treatment Plant		<b>Capital Project Sub Div No 08 PHED, Bhopal (MP)</b>
<b>22.</b>	Operation through Sub Contractor , if any		<b>Not Applicable</b>
<b>23.</b>	Power requirement		<b>750 Units/month</b>
<b>24.</b>	Status of power availability for uninterrupted and continuous running of STP		<b>Continuous running depends on electricity supply</b>
<b>25.</b>	Standby arrangement for power, if any		<b>No</b>
<b>26.</b>	Status of skilled / Trained Manpower		<b>Only skilled manpower</b>
<b>27.</b>	Annual expenditure on O & M & STP		<b>Approx. 5lakhs per annum</b>
<b>28.</b>	Consent from State Pollution Control Board / Pollution Control Committee or Not		<b>Not obtained</b>
<b>29.</b>	Volume of industrial waste being mixed in sewage , if any		<b>No</b>
<b>30.</b>	Status of maintenance of Log Books		<b>One logbook maintained biofilter pump house</b>
<b>31.</b>	Status of Laboratory facility		<b>State Research Lab, PHED , Shyamla Hills, Bhopal (M.P.)</b>

## **STP at Mata Mandir, Bhopal**

**Digester**



**Trickling Filter**



**Clarifier**



**Sludge Drying Beds**

### **3.2 STP at Badwai, Bhopal**

#### **Observations**

- i. The STP at Badwai was constructed under Bhoj wet land Project and commissioned in 2001. The capacity of the plant is 16.7MLD. The treatment system consisting of primary treatment unit and anaerobic lagoon followed by facultative ponds. The flow diagram of the STP is given below.
- ii. The sewage is being collected from (Vijay Nagar, Lalgahati Area, Ahmedabad, Sawar Nagar, Halalipur, Bairagarh, Laukhedi, Khanooagaon, Behta, Indira Nagar, New Sehor Naka) and pumped from Laukhedi pump house to the STP located near the Bhopal Central Jail and Airport.
- iii. The treated wastewater was let out in local Nallah which finally joins Halali dam.
- iv. No skilled operators found engaged for day to day O&M. Only one Security Guard/Helper posted at the plant for STP operation & maintenance purpose.
- v. No Records are available for inlet and outlet flow and daily analysis of operating parameters.
- vi. The officers present at the time of sampling were not aware about the consent to operate under Water Act, 1974.
- vii. Inlet and outlet samples were collected on 23.07.2015 from STP and the analysis results of the samples are given at Table 3&4. The values of pH, BOD, COD and TSS at outlet are found to be 7.77, 31 mg/L, 83 mg/L and 31 mg/L respectively against the prescribed limits of 5.5 -9.0, 30 mg/L, 250 mg/L and 100 mg/L. All the measured values are within the limits except BOD. The values of Total Coliforms and Faecal Coliforms found to be- TNTC (too numerous to count).

#### **Suggestions**

- i. The STP authority should renew the Consent under Water Act, 1974 from MPPCB on priority.
- ii. To engage more manpower and provide proper training to operators.
- iii. To clean the sludge settled in the ponds timely for increasing the capacity and improving the performance.
- iv. To maintain records of inlet & outlet flow and develop laboratory facility at site.
- v. To clean the weeds & bushes, construct pucca roads, lighting and fencing arrangements in the STP premises.

### Detailed information of STP Badwai, Bhopal

1.	<b>Name / Location of STP</b>	: <b>Badwai, Bhopal (M.P.)</b>
2.	Process of Sewage Treatment	: <b>Oxidation Ponds</b>
3.	Flow sheet of STP (to be attached)	: <b>Attached</b>
4.	Designed Capacity / day	: <b>16.7MLD</b>
5.	Actual Treatment	: <b>10.00MLD</b> <b>INLET</b> <b>Screening Chamber</b> <b>Grit Chamber</b> <b>Anaerobic Ponds – 2 no's</b> <b>Facultative Ponds – 2 no's</b> <b>OUTLET</b>
6.	Raw Sewage Characteristics	: <b>23.7.15 CPCB report</b>
	pH	<b>6.93</b>
	COD	<b>458</b>
	BOD	<b>208</b>
	TSS	<b>204</b>
	NH <sub>3</sub> -N	<b>8.23</b>
	Total Nitrogen	<b>10</b>
	Fecal Coli form	<b>TNTC</b>
	Total Coli form	<b>TNTC</b>
7.	Primary Settling Tank	: <b>Not Applicable</b>
8.	Aeration Tank	: <b>Not Applicable</b>
9.	Secondary Settling Tank	: <b>Not Applicable</b>
10.	A. Activated Sludge Process	: <b>Not Applicable</b>
	B. UASB	: <b>Not Applicable</b>
11.	Final Effluent Quantity	: <b>23.7.2015 CPCB Report</b>
	pH	<b>7.77</b>
	COD	<b>83</b>
	BOD	<b>31</b>
	TSS	<b>31</b>
	NH <sub>3</sub> -N	<b>3.04</b>
	Total Nitrogen	<b>3.36</b>
	TC	<b>TNTC</b>
	FC	<b>TNTC</b>
12.	Sludge Thickener	: <b>Not Applicable</b>
13.	Sludge Digesters	<b>Not Applicable</b>
14.	Biogas produced, if any and its composition	<b>Not Applicable</b>
15.	Operational status of gas utilization	<b>Not Applicable</b>
16.	Power generation , if any	<b>Not Applicable</b>
17.	Point of treated sewage disposal (river / lake / irrigation / land and disposal / pisciculture / aquaculture / any other)	<b>Near Badwai Nalla joins Halali river</b>
18.	Bypass arrangement of STPS, if any	<b>Bypass arrangement available after Anaerobic pond</b>
19.	Method of Sludge disposal and status	<b>Satisfactory</b>



	(Satisfactory / Unsatisfactory)	
20.	Operation and maintenance of Sewage Treatment Plant (Satisfactory / Unsatisfactory)	<b>Satisfactory</b>
21.	Agency for operation and maintenance of Sewage Treatment Plant	<b>Executive engineer Capital Project Sub Dn No. 05 PHED, Bhopal</b>
22.	Operation through Sub Contractor , if any	<b>Not Applicable</b>
23.	Power requirement	<b>Not required</b>
24.	Status of power availability for uninterrupted and continuous running of STP	<b>Not Applicable</b>
25.	Standby arrangement for power, if any	<b>Not Applicable</b>
26.	Status of skilled / Trained Manpower	<b>08 Nos</b>
27.	Annual expenditure on O & M & STP	<b>30 lakhs including wage payment</b>
28.	Consent from State Pollution Control Board / Pollution Control Committee or Not	<b>Valid consent not available</b>
29.	Volume of industrial waste being mixed in sewage , if any	<b>---</b>
30.	Status of maintenance of Log Books	<b>Logbook maintained at pumping station</b>
31.	Status of Laboratory facility	<b>State research laboratory of PHED, Shyamla Hills, Bhopal</b>

## STP at Badwai, Bhopal



**Badwai STP**



**Primary Treatment Unit**

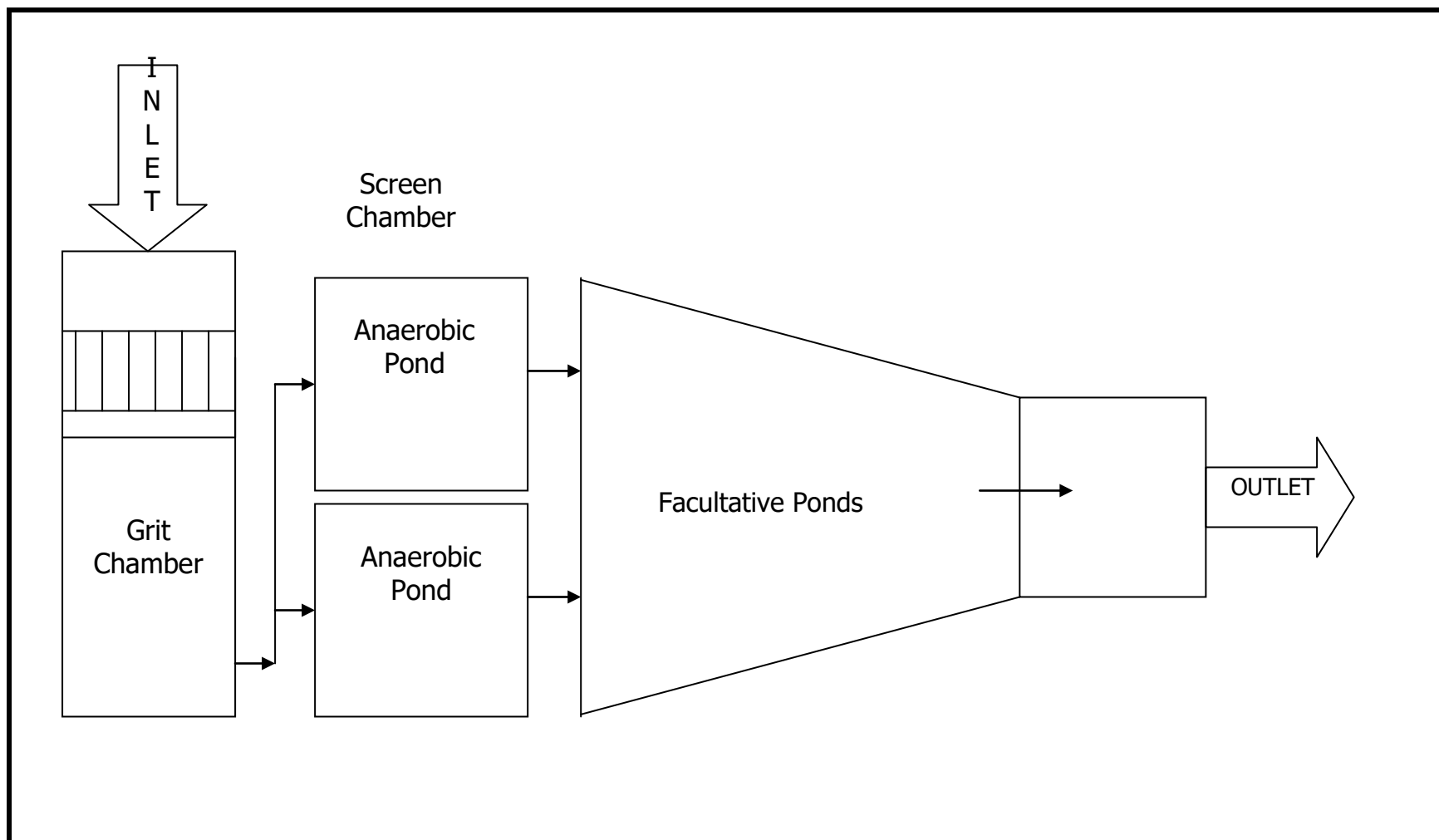
**Anaerobic followed by facultative ponds**



**Anaerobic followed by facultative ponds**



## 16.7 MLD STP at Badwai, Bhopal



### **3.3 STP at Gondarmau, Bhopal:**

#### **Observation**

- i. The STP at Gondarmau was commissioned in 2001 under Bhoj wet land Project and the plant capacity is 2.36 MLD. The treatment system consists of primary treatment unit and anaerobic lagoon followed by facultative ponds. The flow diagram of the STP is given below.
- ii. It was informed that the sewage is being collected from the Tilak Nagar, Panchvati, CTO Area Bairagarh, Kailash Nagar, Devlok Colony, MES Colony, Sarvodaya Colony, 12 Camp, Mathai Nagar and pumped to STP for treatment.
- iii. The plant was in operation at the time of inspection. The treated effluent is being discharged in to the Badwai Nallah without any disinfection. Records are not maintained for inlet and outlet flow etc.,
- iv. It was observed that thick grass grown around the ponds and no road is provided along the bund. It was informed that the ponds are not cleaned from last two years.
- v. Only one watchman cum helper posted at the plant for STP operation & maintenance.
- vi. Laboratory facility not available at the site. It was informed samples are being sent to PHED central lab at Shyamala Hills for analysis once in a month.
- vii. The consent to operate under water Act was expired on 31.12.2013.
- viii. Inlet and outlet samples were collected on 23.07.2015 from STP and the analysis results of the samples are given at Table 3&4. The outlet values of pH, BOD, COD and TSS are found to be 7.51, 64mg/l, 183mg/l and 66 mg/l respectively against the prescribed limits of 5.5 -9.0, 30 mg/l, 250 mg/l and 100 mg/l. All the measured values are within the limits except BOD. The values of Total Coliforms and Feacal Coliforms found to be - TNTC MPN/100ml (too numerous to count).

#### **Suggestions**

- i. The STP authority should renew the Consent under Water Act, 1974 from MPPCB on priority.
- ii. To engage skilled manpower to run the STP & provide training for them.
- iii. To clean the sludge settled in the ponds timely to utilize the design capacity completely.
- iv. To maintain records of inlet & outlet flow and develop laboratory facility at site.
- v. To clean the weeds & bushes, construct pucca roads, lighting and fencing arrangements in the STP premises.
- vi. To disinfect the treated sewage before discharging in any water body etc.

### **Detailed information of STP Gondarmau, Bhopal**

<b>1.</b>	<b>Name / Location of STP</b>	<b>:</b>	<b>Gondarmau, STP Bhopal (M.P.)</b>
<b>2.</b>	Process of Sewage Treatment	<b>:</b>	<b>Oxidation Pond</b>
<b>3.</b>	Flow sheet of STP (to be attached)	<b>:</b>	<b>Attached</b>
<b>4.</b>	Designed Capacity / day	<b>:</b>	<b>2.36MLD</b>
<b>5.</b>	Actual Treatment	<b>:</b>	<b>2.00MLD</b> <b>INLET</b> <b>Screening Chamber</b> <b>Grit Chamber</b> <b>Anaerobic Ponds 01 Nos</b> <b>Facultative Ponds 02Nos</b> <b>OUTLET</b>
<b>6.</b>	Raw Sewage Characteristics	<b>:</b>	<b>23.7.2015 CPCB report</b>
	pH COD BOD TSS NH <sub>3</sub> -N Total Nitrogen Fecal Coli form Total Coli form		<b>6.96</b> <b>194</b> <b>65</b> <b>87</b> <b>9.58</b> <b>19.6</b> <b>TNTC</b> <b>TNTC</b>
<b>7.</b>	Primary Settling Tank	<b>:</b>	<b>Not Applicable</b>
<b>8.</b>	Aeration Tank	<b>:</b>	<b>Not Applicable</b>
<b>9.</b>	Secondary Settling Tank	<b>:</b>	<b>Not Applicable</b>
<b>10.</b>	A. Activated Sludge Process	<b>:</b>	<b>Not Applicable</b>
	B. UASB	<b>:</b>	<b>Not Applicable</b>
<b>11.</b>	Final Effluent Quantity	<b>:</b>	<b>23.7.2015 CPCB report</b>
	pH COD BOD TSS NH <sub>3</sub> -N Total Nitrogen, TC FC		<b>7.51</b> <b>183</b> <b>64</b> <b>66</b> <b>5.02</b> <b>7.84</b> <b>TNTC</b> <b>TNTC</b>
<b>12.</b>	Sludge Thickener	<b>:</b>	<b>Not Applicable</b>
<b>13.</b>	Sludge Digesters		<b>Not Applicable</b>
<b>14.</b>	Biogas produced, if any and its composition		<b>Not Applicable</b>
<b>15.</b>	Operational status of gas utilization		<b>Not Applicable</b>
<b>16.</b>	Power generation , if any		<b>Not Applicable</b>
<b>17.</b>	Point of treated sewage disposal		<b>Near Badwai drain joins river Halali</b>
<b>18.</b>	Bypass arrangement of STPS, if any		<b>Bypass arrangement available after anaerobic pond</b>
<b>19.</b>	Method of Sludge disposal and status (Satisfactory / Unsatisfactory)		<b>Satisfactory</b>
<b>20.</b>	Operation and maintenance of Sewage Treatment Plant (Satisfactory /		<b>Satisfactory</b>

<b>21.</b>	Agency for operation and maintenance of Sewage Treatment Plant	<b>Executive engineer Capital Project Sub Dn No. 05 PHED, Bhopal</b>
<b>22.</b>	Operation through Sub Contractor , if any	<b>Not Applicable</b>
<b>23.</b>	Power requirement	<b>Not required</b>
<b>24.</b>	Status of power availability for uninterrupted and continuous running of STP	<b>Not Applicable</b>
<b>25.</b>	Standby arrangement for power, if any	<b>Not Applicable</b>
<b>26.</b>	Status of skilled / Trained Manpower	<b>02 Nos</b>
<b>27.</b>	Annual expenditure on O & M & STP	<b>20 lakhs including wages payment</b>
<b>28.</b>	Consent from State Pollution Control Board / Pollution Control Committee or No	<b>Valid consent not available</b>
<b>29.</b>	Volume of industrial waste being mixed in sewage , if any	<b>NO</b>
<b>30.</b>	Status of maintenance of Log Books	<b>Logbook maintain at pumping station Tilak nagar</b>
<b>31.</b>	Status of Laboratory facility	<b>State research laboratory PHED, Shyamla Hills, Bhopal</b>

## STP at Gondarmau, Bhopal

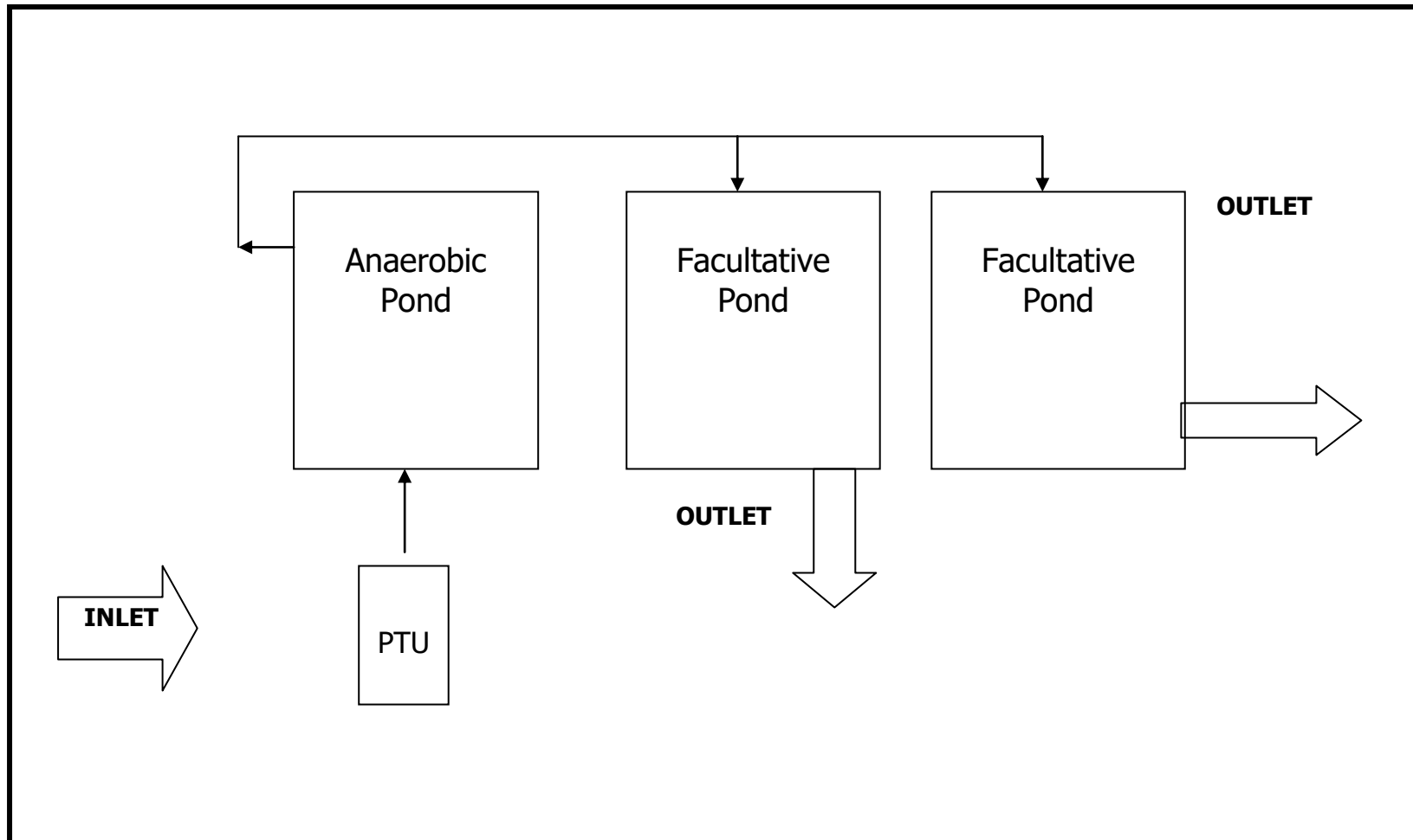


Gondarmau STP  
Primary treatment unit

### Anaerobic ponds followed by facultative ponds



### 2.36 MLD STP at Gondarmau, Bhopal





### **3.4 STP at Maholi Damkheda, Bhopal**

#### **Observation**

- i. The plant was commissioned in 2001 under Bhoj wet land Project and its capacity is 25MLD.
- ii. The treatment system consists of primary treatment unit & anaerobic lagoon followed by facultative ponds. The flow diagram of the STP is shown below.
- iii. It was informed that the sewage is being collected from the Vardaman, Ginnori, MLB Collage Area, Banganga, Patra Pump House Area, Kolu Area and pumped to STP.
- iv. Plant is running under capacity of 18MLD against its designed capacity of 25MLD. The treated sewage is being discharged in Patra drain.
- v. Roads & Fencing provided around the STP but arrangement for lighting is still not made.
- vi. No skilled operators were engaged for day to day O&M. One watchman and one helper posted at the plant for STP operation & maintenance purposes.
- vii. No Record is being maintained for inflow and outflow and daily analysis of operating parameters. It was informed that samples are being sent to PHED central lab at Shyamla Hills for analysis once in a month but the reports were not available.
- viii. The consent to operate under water Act was expired on 31.12.2013.
- ix. It appear that the sludge in the ponds doesn't cleaned since many years resulted reduction in retention time of sewage in STP which ultimately decreases the performance of plant.
- x. Inlet and outlet samples were collected on 23.07.2015 and the analysis results of the samples are given at Table 3 &4. The values of pH, BOD, COD and TSS at outlet were found to be 8.76, 25 mg/l, 62 mg/l and 56 mg/l respectively against the prescribed limits of 5.5 -9.0, 30 mg/l, 250 mg/l and 100 mg/l. All the measured values are found to be within the prescribed limits. The values of Total Coliforms and Feacal Coliforms are found to be TNTC MPN/100ml (too numerous to count).

#### **Suggestions**

- The STP authorities should renew the Consent under Water Act, 1974 from MPPCB on priority.
- To engage skilled manpower to run the STP, sewage pumping house & provide training for the same.
- To clean the sludge from the ponds regularly to utilize the designed capacity of STP.
- To maintain records of inlet & outlet flow and also to develop laboratory facility at site for analysis of required parameters.
- To provide lighting arrangements in the STP premises.
- To disinfect the treated wastewater before discharging in Patra Nallah.

### **Detailed information of STP Mohali Damkheda, Bhopal**

<b>1.</b>	<b>Name / Location of STP</b>	<b>:</b>	<b>Mohali Damkheda, Bhopal</b>
<b>2.</b>	<b>Process of Sewage Treatment</b>	<b>:</b>	<b>Waste Stabilization Pond</b>
<b>3.</b>	<b>Flow sheet of STP (to be attached)</b>	<b>:</b>	<b>Attached</b>
<b>4.</b>	<b>Designed Capacity / day</b>	<b>:</b>	<b>25 MLD</b>
<b>5.</b>	<b>Actual Treatment</b>	<b>:</b>	<b>18 MLD</b> <b>INLET</b> <b>Screening Chamber</b> <b>Grit Chamber</b> <b>Anaerobic Ponds 02 Nos</b> <b>Facultative Ponds 03Nos</b>
<b>6.</b>	<b>Raw Sewage Characteristics</b>	<b>:</b>	<b>CPCB report</b>
	pH COD BOD TSS NH <sub>3</sub> -N Total Nitrogen Fecal Coli form Total Coli form		<b>6.88</b> <b>115</b> <b>74</b> <b>79</b> <b>7.56</b> <b>10.6</b> <b>TNTC</b> <b>TNTC</b>
<b>7.</b>	<b>Primary Settling Tank</b>	<b>:</b>	<b>Not Applicable</b>
<b>8.</b>	<b>Aeration Tank</b>	<b>:</b>	<b>Not Applicable</b>
<b>9.</b>	<b>Secondary Settling Tank</b>	<b>:</b>	<b>Not Applicable</b>
<b>10.</b>	<b>A. Activated Sludge Process</b>	<b>:</b>	<b>Not Applicable</b>
	<b>B. UASB</b>	<b>:</b>	<b>Not Applicable</b>
<b>11.</b>	<b>Final Effluent Quantity</b>	<b>:</b>	<b>CPCB report</b>
	pH COD BOD TSS NH <sub>3</sub> -N Total Nitrogen, TC FC		<b>8.76</b> <b>62</b> <b>25</b> <b>56</b> <b>2.73</b> <b>8.4</b> <b>TNTC</b> <b>TNTC</b>
<b>12.</b>	<b>Sludge Thickener</b>	<b>:</b>	<b>Not Applicable</b>
<b>13.</b>	<b>Sludge Digesters</b>		<b>Not Applicable</b>
<b>14.</b>	<b>Biogas produced, if any and its composition</b>		<b>Not Applicable</b>
<b>15.</b>	<b>Operational status of gas utilization</b>		<b>Not Applicable</b>
<b>16.</b>	<b>Power generation , if any</b>		<b>Not Applicable</b>
<b>17.</b>	<b>Point of treated sewage disposal</b>		<b>Patra drain</b>
<b>18.</b>	<b>Bypass arrangement of STPS, if any</b>		<b>Bypass arrangement after primary treatment unit</b>
<b>19.</b>	<b>Method of Sludge disposal and status (Satisfactory / Unsatisfactory)</b>		<b>Satisfactory</b>
<b>20.</b>	<b>Operation and maintenance of Sewage Treatment Plant</b>		<b>Satisfactory</b>

<b>21.</b>	Agency for operation and maintenance of Sewage Treatment Plant	<b>Capital Project Sub Dn No. 05 PHED, Bhopal</b>
<b>22.</b>	Operation through Sub Contractor , if any	<b>Not Applicable</b>
<b>23.</b>	Power requirement	<b>Not required</b>
<b>24.</b>	Status of power availability for uninterrupted and continuous running of STP	<b>Not Applicable</b>
<b>25.</b>	Standby arrangement for power, if any	<b>Not Applicable</b>
<b>26.</b>	Status of skilled / Trained Manpower	<b>07 Nos</b>
<b>27.</b>	Annual expenditure on O & M & STP	<b>15 lakhs</b>
<b>28.</b>	Consent from State Pollution Control Board / Pollution Control Committee or No	<b>Valid consent not obtained</b>
<b>29.</b>	Volume of industrial waste being mixed in sewage , if any	<b>NO</b>
<b>30.</b>	Status of maintenance of Log Books	<b>Logbook maintain at pumping house</b>
<b>31.</b>	Status of Laboratory facility	<b>State research laboratory PHED, Shyamla Hills, Bhopal</b>

## **STP at Maholi Damkheda, Bhopal**



**Maholi Damkheda STP**

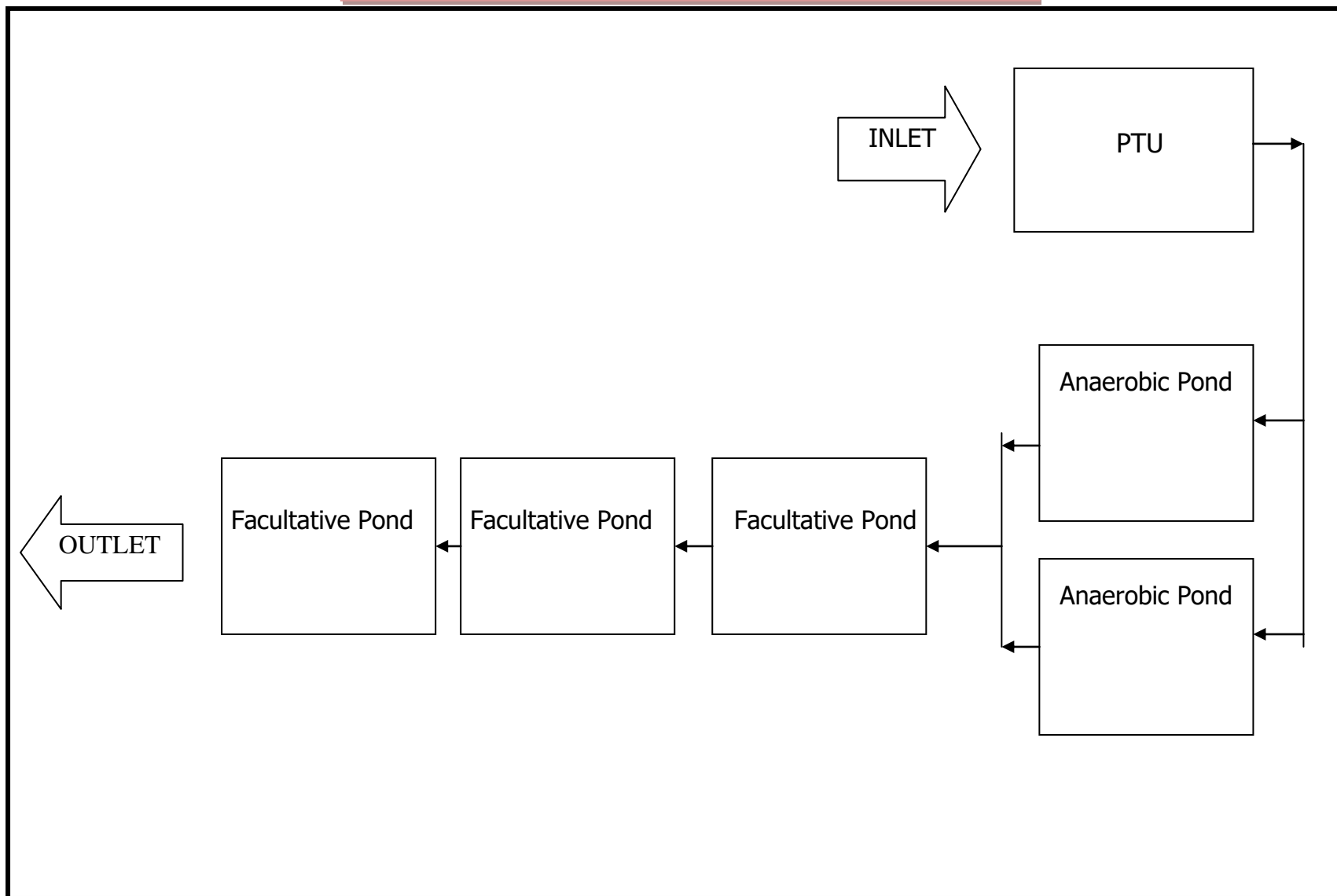


**Primary treatment unit**



**Anaerobic Ponds followed by Facultative Ponds**

## 25 MLD STP at Maholi Damkheda, Bhopal



### **3.5 STP at Kotra, Bhopal**

#### **Observation**

- i. The STP was commissioned in 2001 under Bhoj wet land Project.
- ii. The capacity of the plant is 10MLD and the sewage is being collected from Nehru Nagar, Kotra, Kamla Nagar, Vaishali Nagar and Gandhi Basti Area.
- iii. The treatment system consists primary treatment unit and anaerobic lagoon followed by facultative ponds, rock filter for polishing and cascade for aerating the final effluent. The flow diagram of the STP is given below.
- iv. During visit, the plant was in operation, floating materials & weeds were observed in the ponds. The problem of foul smell reflects that sludge is being digested anaerobically and converting in methane.
- v. The treated effluent meeting the norms therefore the wastewater can be reused in plantation, irrigation and other commercial purposes etc. after proper disinfection.
- vi. Treated effluent discharged in local drain that meets to Kaliyasot reservoir.
- vii. Inlet and outlet samples were collected on 27.07.2015 from STP and the analysis results of the samples are given at Table 3&4. The values of pH, BOD, COD and TSS at outlet are found to be 7.6, 6.9 mg/L, 24 mg/l and 12 mg/l respectively against the prescribed limits of 5.5 -9.0, 30 mg/l, 250 mg/L and 100 mg/L,. All the measured values are found within the prescribed limits. The values of Total Coliforms and Faecal Coliforms values are TNTC MPN/100ml (too numerous to count).

#### **Suggestions**

- The STP authority should renew the Consent under Water Act, 1974 from MPPCB on priority.
- To engage skilled manpower & provide training for STP O & M.
- To clean the sludge from the ponds regularly to utilize the designed capacity and to control foul odour
- To maintain records of inlet & outlet flow and also to develop laboratory facility at site for analysis of required parameters.
- To disinfect the treated sewage before discharging in local drain.
- To clean the ponds regularly for controlling the weeds development on the water surface.

### **Detailed information of STP, Kotra, Bhopal**

<b>1.</b>	<b>Name / Location of STP</b>	<b>:</b>	<b>Kotra, Bhopal</b>
<b>2.</b>	<b>Process of Sewage Treatment</b>	<b>:</b>	<b>Waste Stabilization Pond</b>
<b>3.</b>	<b>Flow sheet of STP (to be attached)</b>	<b>:</b>	<b>Attached</b>
<b>4.</b>	<b>Designed Capacity / day</b>	<b>:</b>	<b>10 MLD</b>
<b>5.</b>	<b>Actual Treatment</b>	<b>:</b>	<b>8 MLD</b> <b>INLET</b> <b>Screening Chamber</b> <b>Grit Chamber</b> <b>Anaerobic- 2 Nos</b> <b>Facultative- 3 Nos</b> <b>Rock Filter &amp; OUTLET</b>
<b>6.</b>	<b>Raw Sewage Characteristics</b>	<b>:</b>	<b>CPCB report</b>
	pH COD BOD TSS NH <sub>3</sub> -N Total Nitrogen Fecal Coli form Total Coli form		<b>7.2</b> <b>93</b> <b>21</b> <b>29</b> <b>1.53</b> <b>3.92</b> <b>TNTC</b> <b>TNTC</b>
<b>7.</b>	<b>Primary Settling Tank</b>	<b>:</b>	<b>Not Applicable</b>
<b>8.</b>	<b>Aeration Tank</b>	<b>:</b>	<b>Not Applicable</b>
<b>9.</b>	<b>Secondary Settling Tank</b>	<b>:</b>	<b>Not Applicable</b>
<b>10.</b>	<b>A. Activated Sludge Process</b>	<b>:</b>	<b>Not Applicable</b>
	<b>B. UASB</b>	<b>:</b>	<b>Not Applicable</b>
<b>11.</b>	<b>Final Effluent Quantity</b>	<b>:</b>	<b>CPCB report</b>
	pH COD BOD TSS NH <sub>3</sub> -N Total Nitrogen, TC FC		<b>7.6</b> <b>24</b> <b>6.9</b> <b>12</b> <b>0.45</b> <b>8.96</b> <b>TNTC</b> <b>TNTC</b>
<b>12.</b>	<b>Sludge Thickener</b>	<b>:</b>	<b>Not Applicable</b>
<b>13.</b>	<b>Sludge Digesters</b>		<b>Not Applicable</b>
<b>14.</b>	<b>Biogas produced, if any and its composition</b>		<b>Not Applicable</b>
<b>15.</b>	<b>Operational status of gas utilization</b>		<b>Not Applicable</b>
<b>16.</b>	<b>Power generation , if any</b>		<b>Not Applicable</b>
<b>17.</b>	<b>Point of treated sewage disposal</b>		<b>Kaliyasot dam</b>
<b>18.</b>	<b>Bypass arrangement of STPS, if any</b>		<b>Bypass arrangement at facultative pond</b>
<b>19.</b>	<b>Method of Sludge disposal and status (Satisfactory / Unsatisfactory)</b>		<b>Satisfactory</b>

<b>20.</b>	Operation and maintenance of Sewage Treatment Plant (Satisfactory / Unsatisfactory)	<b>Satisfactory</b>
<b>21.</b>	Agency for operation and maintenance of Sewage Treatment Plant	<b>Capital Project Sub Dn No. 06 PHED, Bhopal</b>
<b>22.</b>	Operation through Sub Contractor , if any	<b>Not Applicable</b>
<b>23.</b>	Power requirement	<b>Not required</b>
<b>24.</b>	Status of power availability for uninterrupted and continuous running of STP	<b>Not Applicable</b>
<b>25.</b>	Standby arrangement for power, if any	<b>Not Applicable</b>
<b>26.</b>	Status of skilled / Trained Manpower	<b>08 Nos</b>
<b>27.</b>	Annual expenditure on O & M & STP	<b>10.0 lakhs annum</b>
<b>28.</b>	Consent from State Pollution Control Board / Pollution Control Committee or No	<b>Not obtained</b>
<b>29.</b>	Volume of industrial waste being mixed in sewage , if any	<b>NO</b>
<b>30.</b>	Status of maintenance of Log Books	<b>Logbook maintain at pump house</b>
<b>31.</b>	Status of Laboratory facility	<b>State research laboratory PHED, Shyamla Hills, Bhopal</b>



## STP at Kotra, Bhopal

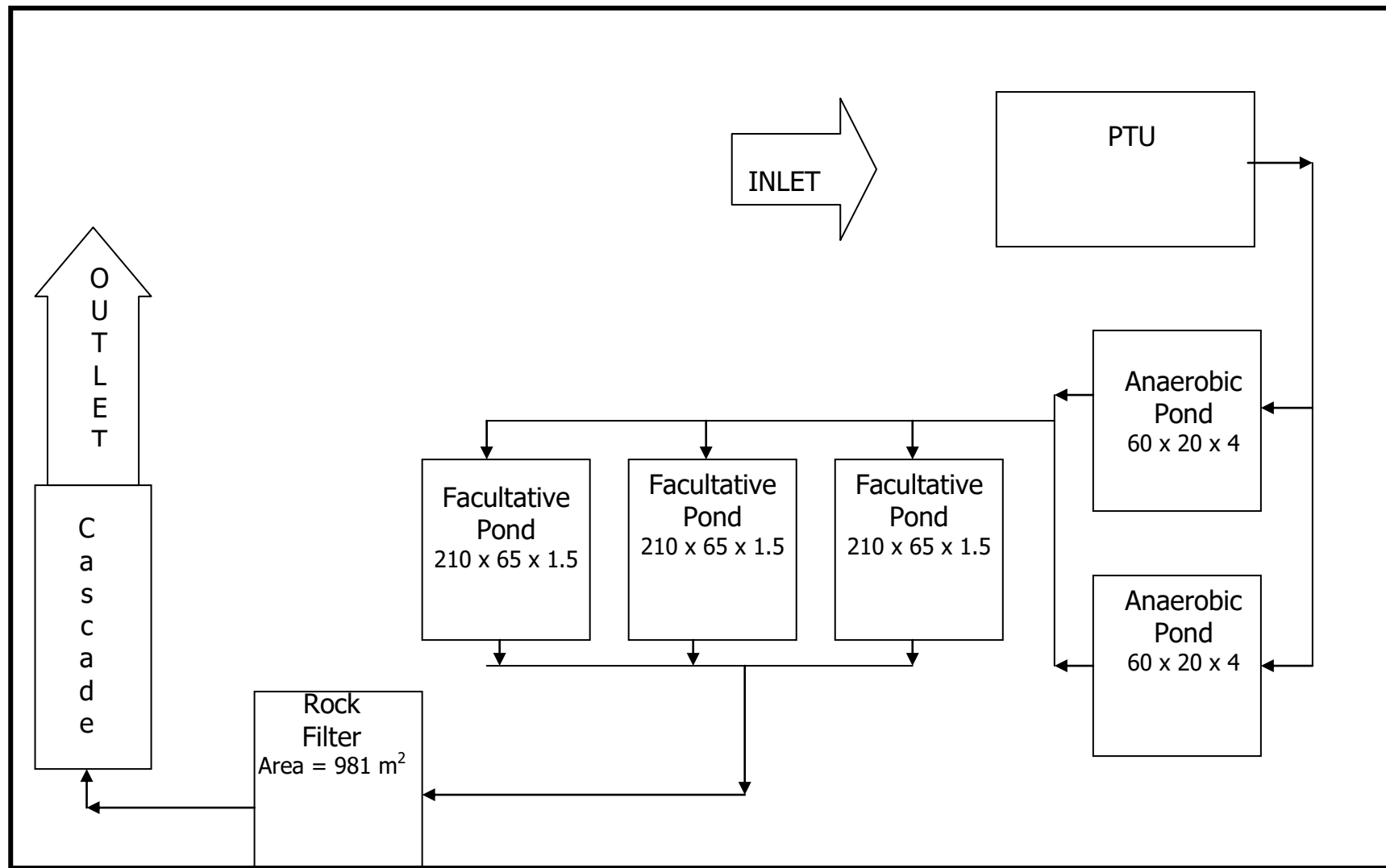


**Primary Treatment Unit**

## **Anaerobic Ponds followed by Facultative**



## 10 MLD STP at Kotra, Bhopal



### **3.6 STP at Ekant Park, Bhopal**

#### **Observation**

- The STP was constructed and commissioned in 2008 under National River Conservation Plan.
- The treatment system consists primary treatment unit followed by one oxidation pond. The capacity of the plant is 8MLD and the sewage is collected from Panchsheel Nallah.
- PHED operating the plant and during visit the plant was in operation. The treated sewage was discharging in Shahpura lake
- Thick grass & weeds developed around the pond and approach road & lighting arrangement are not provided.
- Inlet and outlet samples were collected on 27.07.2015 from STP and the analysis results of the samples are given at Table 3&4. The values of pH, BOD, COD and TSS at outlet are found to be 8.1, 7.8 mg/L, 48 mg/L and 13 mg/L respectively against the prescribed limits of 5.5 -9.0, 30 mg/L, 250 mg/L and 100 mg/L. All the measured values are found within the prescribed limits. The values of Total Coliforms and Feacal Coliforms values are TNTC MPN/100ml (too numerous to count).

#### **Suggestions**

- The STP authority should obtain the Consent under Water Act, 1974 from MPPCB on priority.
- To provide proper training to operators and supervisors for running and O & M of STP.
- To install flow measuring devices and maintain records of inlet & outlet flow.
- To engage adequate and skilled manpower for O&M of STP.
- To disinfect the treated wastewater before discharging in shahpura lake.
- To take necessary measures for regular desludging of pond to control foul odour resulted from anaerobic digestion of collected sludge. The weeds developed on the water surface of the pond should also be cleaned.
- To stop by-passing of sewage and use the treated sewage after disinfection in plantation /irrigation purposes in Ekant park.
- To provide fencing and lighting arrangement around the premises of STP.

### **Detailed information of STP Ekant Park, Bhopal**

<b>1.</b>	<b>Name / Location of STP</b>	<b>:</b>	<b>Ekant Park, Bhopal</b>
<b>2.</b>	Process of Sewage Treatment	<b>:</b>	<b>Oxidation Pond</b>
<b>3.</b>	Flow sheet of STP (to be attached)	<b>:</b>	<b>Attached</b>
<b>4.</b>	Designed Capacity / day	<b>:</b>	<b>8 MLD</b>
<b>5.</b>	Actual Treatment	<b>:</b>	<b>7.6 MLD INLET Screening Chamber Grit Chamber Oxidation pond OUTLET</b>
<b>6.</b>	Raw Sewage Characteristics	<b>:</b>	<b>CPCB report</b>
	pH COD BOD TSS NH <sub>3</sub> -N Total Nitrogen Fecal Coli form Total Coli form		<b>7.2 30 8.2 8.0 0.65 7.28 TNTC TNTC</b>
<b>7.</b>	Primary Settling Tank	<b>:</b>	<b>Not Applicable</b>
<b>8.</b>	Aeration Tank	<b>:</b>	<b>Not Applicable</b>
<b>9.</b>	Secondary Settling Tank	<b>:</b>	<b>Not Applicable</b>
<b>10.</b>	A. Activated Sludge Process	<b>:</b>	<b>Not Applicable</b>
	B. UASB	<b>:</b>	<b>Not Applicable</b>
<b>11.</b>	Final Effluent Quantity	<b>:</b>	<b>CPCB report</b>
	pH COD BOD TSS NH <sub>3</sub> -N Total Nitrogen, TC FC		<b>8.1 48 7.8 13 0.311 5.6 TNTC TNTC</b>
<b>12.</b>	Sludge Thickener	<b>:</b>	<b>Not Applicable</b>
<b>13.</b>	Sludge Digesters		<b>Not Applicable</b>
<b>14.</b>	Biogas produced, if any and its composition		<b>Not Applicable</b>
<b>15.</b>	Operational status of gas utilization		<b>Not Applicable</b>
<b>16.</b>	Power generation , if any		<b>Not Applicable</b>
<b>17.</b>	Point of treated sewage disposal		<b>Shapura Lake</b>
<b>18.</b>	Bypass arrangement of STPS, if any		<b>Bypass arrangement before inlet of primary treatment unit</b>

<b>19.</b>	Method of Sludge disposal and status (Satisfactory / Unsatisfactory)	<b>Satisfactory</b>
<b>20.</b>	Operation and maintenance of Sewage Treatment Plant (Satisfactory / Unsatisfactory)	<b>Satisfactory</b>
<b>21.</b>	Agency for operation and maintenance of Sewage Treatment Plant	<b>Capital Project Sub Dn No. 08 PHED, Bhopal</b>
<b>22.</b>	Operation through Sub Contractor , if any	<b>Not Applicable</b>
<b>23.</b>	Power requirement	<b>Not required</b>
<b>24.</b>	Status of power availability for uninterrupted and continuous running of STP	<b>Not Applicable</b>
<b>25.</b>	Standby arrangement for power, if any	<b>Not Applicable</b>
<b>26.</b>	Status of skilled / Trained Manpower	<b>02 Nos</b>
<b>27.</b>	Annual expenditure on O & M & STP	<b>7.0 lakhs approx</b>
<b>28.</b>	Consent from State Pollution Control Board / Pollution Control Committee or No	<b>Not obtained</b>
<b>29.</b>	Volume of industrial waste being mixed in sewage , if any	<b>NO</b>
<b>30.</b>	Status of maintenance of Log Books	<b>NO</b>
<b>31.</b>	Status of Laboratory facility	<b>State research laboratory PHED, Shyamla Hills, Bhopal</b>

## STP at Ekant Park, Bhopal



## Oxidation Ponds



### **3.7 STP Bawaria Kalan, Bhopal**

#### **Observation**

- The 13.56 MLD STP at Bawaria Kalan was constructed by Madhya Pradesh Government in 1975 and presently being operated by PHED. Only one unskilled person engaged for the operation & maintenance of STP.
- The STP was designed for 13.56 MLD but running under designed capacity i.e. 8 MLD only because of poor sewage collection networks. Presently the Sewage has been collected from 3 pump houses located at Habibganj, Shahpura and Manisha Market.
- The STP has 8 waste stabilization ponds which are spread in 10 acres area. Only 01 pond was cleaned 04 months back. As per the operator, other ponds could not be cleaned due to insufficient funds.
- The treated sewage is being discharged into Bawaria Kalan Nallah which finally joins in to Kaliasot River.
- The STP has no fencing/ boundary wall, lighting arrangement and roads around the waste stabilization ponds. Lots of weeds developed on the water surface of the WSPs.
- Inlet and outlet samples were collected on 27.07.2015 from STP and the analysis results of the samples are given at Table 3&4. The values of pH, BOD, COD and TSS at outlet found to be 8.4, 8.5 mg/L, 66 mg/L and 18 mg/L respectively against the prescribed limits of 5.5 -9.0, 30 mg/L, 250 mg/L and 100 mg/L, respectively. All the measured values are found within the prescribed limits. The values of Total Coliforms and Faecal Coliforms values are TNTC MPN/100ml (too numerous to count).

#### **Suggestions:**

- The STP authority should obtain the Consent under Water Act, 1974 from MPPCB on priority.
- To provide sufficient trained and skilled manpower for proper operation and maintenance of STP.
- To clean the bottom sludge from the ponds regularly for proper functioning and performance of STP & To maintain records of inflow & outflow.
- To disinfect the treated sewage before discharging in Kaliasot River.
- To take necessary measures for desludging and cleaning of weeds to control foul odour in ponds.
- To clean the floating material from primary treatment units.



### **Detailed of STP Bawariakalan, Bhopal**

<b>1.</b>	<b>Name / Location of STP</b>	<b>:</b>	<b>Bawariakalan, Bhopal</b>
<b>2.</b>	Process of Sewage Treatment	<b>:</b>	<b>Oxidation Pond</b>
<b>3.</b>	Flow sheet of STP (to be attached)	<b>:</b>	<b>Attached</b>
<b>4.</b>	Designed Capacity / day	<b>:</b>	<b>13.56 MLD</b>
<b>5.</b>	Actual Treatment	<b>:</b>	<b>8 MLD</b> <b>INLET</b> <b>Facultative pond- 08 Nos</b> <b>OUTLET</b>
<b>6.</b>	Raw Sewage Characteristics	<b>:</b>	<b>CPCB report</b>
	pH		<b>7.1</b>
	COD		<b>30</b>
	BOD		<b>5.2</b>
	TSS		<b>4.0</b>
	NH <sub>3</sub> -N		<b>2.55</b>
	Total Nitrogen		<b>14.56</b>
	Fecal Coli form		<b>TNTC</b>
	Total Coli form		<b>TNTC</b>
<b>7.</b>	Primary Settling Tank	<b>:</b>	<b>Not Applicable</b>
<b>8.</b>	Aeration Tank	<b>:</b>	<b>Not Applicable</b>
<b>9.</b>	Secondary Settling Tank	<b>:</b>	<b>Not Applicable</b>
<b>10.</b>	A. Activated Sludge Process	<b>:</b>	<b>Not Applicable</b>
	B. UASB	<b>:</b>	<b>Not Applicable</b>
<b>11.</b>	Final Effluent Quantity	<b>:</b>	<b>CPCB report</b>
	pH		<b>8.4</b>
	COD		<b>66</b>
	BOD		<b>8.5</b>
	TSS		<b>18</b>
	NH <sub>3</sub> -N		<b>0.24</b>
	Total Nitrogen,		<b>6.16</b>
	TC		<b>TNTC</b>
	FC		<b>TNTC</b>
<b>12.</b>	Sludge Thickener	<b>:</b>	<b>Not Applicable</b>
<b>13.</b>	Sludge Digesters		<b>Not Applicable</b>
<b>14.</b>	Biogas produced, if any and its composition		<b>Not Applicable</b>
<b>15.</b>	Operational status of gas utilization		<b>Not Applicable</b>
<b>16.</b>	Power generation , if any		<b>Not Applicable</b>
<b>17.</b>	Point of treated sewage disposal		<b>Bawaria Drain</b>
<b>18.</b>	Bypass arrangement of STPS, if any		<b>NO bypass arrangement</b>
<b>19.</b>	Method of Sludge disposal and status (Satisfactory / Unsatisfactory)		<b>Satisfactory</b>



20.	Operation and maintenance of Sewage Treatment Plant (Satisfactory / Unsatisfactory)	<b>Satisfactory</b>
21.	Agency for operation and maintenance of Sewage Treatment Plant	<b>Capital Project Sub Dn No. 08 PHED, Bhopal</b>
22.	Operation through Sub Contractor , if any	<b>Not Applicable</b>
23.	Power requirement	<b>Not required</b>
24.	Status of power availability for uninterrupted and continuous running of STP	<b>Not Applicable</b>
25.	Standby arrangement for power, if any	<b>Not Applicable</b>
26.	Status of skilled / Trained Manpower	<b>02 Nos</b>
27.	Annual expenditure on O & M & STP	<b>10.0 lakhs annum for O&amp;M</b>
28.	Consent from State Pollution Control Board / Pollution Control Committee or No	<b>Not obtained</b>
29.	Volume of industrial waste being mixed in sewage , if any	<b>NO</b>
30.	Status of maintenance of Log Books	<b>Logbook maintain at Shahpura Sewer pump station</b>
31.	Status of Laboratory facility	<b>State research laboratory PHED, Shyamla Hills, Bhopal</b>

### **STP Bawaria Kalan, Bhopal**



### **Facultative Ponds**



## **4.0 STP at Laltipara in Gwalior**

### **Observation**

Gwalior city has population of around 10lacs (census 2011) & as 135LPCD is the water supply average which results in more than 100 million liter sewage. To treat the sewage of Gwalior city, a (WSP) technology based 50 MLD STP at Laltipara got constructed in 2005 and operational since 2010.

- The waste collected through drain got treated in anaerobic ponds of 1 day retention period followed by facultative ponds of 4.5days retention period. Plant has made bypass arrangement to discharge untreated sewage to Ghasmandi drain on maintenance. The O&M of plant is carried out by Public Health Engineering Department (PHED), Gwalior.
- The plant has installed 08 pumps of 75 HP capacity & 02 pumps of 40 HP capacity to pump the raw sewage. Plant needs to install flow meter as presently flow is measured based on pump running hours; the flow recorded on the day of visit was 18.34 LMD.
- The bottom sludge of ponds was never scrapped which resulted in low retention period for treatment. The treated sewage got discharged through Ghasmandi drain that meets River Morar.
- Unit is maintaining logbook to record the operational status of plant however unit needs to develop a laboratory to analyze the essential parameter on regular basis.
- Unit has developed heavy plantation area in premises along with the fire safety provisions whereas roads are still kaccha and needs to be concreted. Fire extinguishers and sand buckets provided for protection from fire in the plant.

### **Suggestions**

- a. To augment the design capacity of plant or construct another STP; considering futuristic projection of agglomeration.
- b. To apply for renewal of consent to operate required under Water (P&CP) Act 1974 from MPPCB without further delay.
- c. To install flow meter devices at inlet & outlet point.
- d. To chlorinate the sewer before discharge to meet the prescribed norms of discharge.
- e. To concrete the internal roads and scrap the bottom sludge on regular interval to maintain the performance of WSP.

### **Detailed information of Morar (Laltipara)) STP, Morar, Gwalior**

<b>1.</b>	<b>Name / Location of STP</b>	<b>:</b>	<b>Morar (Laltipara)) STP, Morar, Gwalior</b>
<b>2.</b>	<b>Process of Sewage Treatment</b>	<b>:</b>	<b>Waste Stabilization Pond</b>
<b>3.</b>	<b>Flow sheet of STP (to be attached)</b>	<b>:</b>	<b>Attached</b>
<b>4.</b>	<b>Designed Capacity / day</b>	<b>:</b>	<b>50 MLD</b>
<b>5.</b>	<b>Actual Treatment</b>	<b>:</b>	<b>8 MLD INLET Screen Chamber Grit Chamber Parshal flume Anerobic pond Facultative pond Ghasmandi Drain, Morar river OUTLET</b>
<b>6.</b>	<b>Raw Sewage Characteristics</b>	<b>:</b>	<b>CPCB report</b>
	pH		<b>7.0</b>
	COD		<b>74</b>
	BOD		<b>16</b>
	TSS		<b>134</b>
	NH <sub>3</sub> -N		<b>7.43</b>
	Total Nitrogen		<b>21</b>
	Fecal Coli form		<b>TNTC</b>
	Total Coli form		<b>TNTC</b>
<b>7.</b>	<b>Primary Settling Tank</b>	<b>:</b>	<b>Not Applicable</b>
<b>8.</b>	<b>Aeration Tank</b>	<b>:</b>	<b>Not Applicable</b>
<b>9.</b>	<b>Secondary Settling Tank</b>	<b>:</b>	<b>Not Applicable</b>
<b>10.</b>	<b>A. Activated Sludge Process</b>	<b>:</b>	<b>Not Applicable</b>
	<b>B. UASB</b>	<b>:</b>	<b>Not Applicable</b>
<b>11.</b>	<b>Final Effluent Quantity</b>	<b>:</b>	<b>CPCB report</b>
	pH		<b>7.33</b>
	COD		<b>48</b>
	BOD		<b>11</b>
	TSS		<b>104</b>
	NH <sub>3</sub> -N		<b>6.53</b>
	Total Nitrogen,		<b>12</b>
	TC		<b>TNTC</b>
	FC		<b>TNTC</b>
<b>12.</b>	<b>Sludge Thickener</b>	<b>:</b>	<b>Not Applicable</b>
<b>13.</b>	<b>Sludge Digesters</b>		<b>Not Applicable</b>
<b>14.</b>	<b>Biogas produced, if any and its composition</b>		<b>Not Applicable</b>
<b>15.</b>	<b>Operational status of gas utilization</b>		<b>Not Applicable</b>
<b>16.</b>	<b>Power generation , if any</b>		<b>Not Applicable</b>

17.	Point of treated sewage disposal	<b>Ghasmandi Drain joins River Morar</b>
18.	Bypass arrangement of STPS, if any	<b>Yes, RCC pipe at inlet chamber discharge into</b>
19.	Method of Sludge disposal and status (Satisfactory / Unsatisfactory)	<b>Unsatisfactory</b>
20.	Operation and maintenance of Sewage Treatment Plant (Satisfactory / Unsatisfactory)	<b>Removal of sludge found unsatisfactory</b>
21.	Agency for operation and maintenance of Sewage Treatment Plant	<b>PHED Project Division Gwalior</b>
22.	Operation through Sub Contractor , if any	<b>Not Applicable</b>
23.	Power requirement	<b>Yes, By MPMKVV Co. 350KVA</b>
24.	Status of power availability for uninterrupted and continuous running of STP	<b>Continuous</b>
25.	Standby arrangement for power, if any	<b>Not Applicable</b>
26.	Status of skilled / Trained Manpower	<b>Sh Satish Chandra Srivastava, Incharge Sh Hari Singh, Pump Operator</b>
27.	Annual expenditure on O & M & STP	<b>40.0 lakhs eclectic charges year 2014</b>
28.	Consent from State Pollution Control Board / Pollution Control Committee or No	<b>Obtained but was not available at plant</b>
29.	Volume of industrial waste being mixed in sewage , if any	<b>NO</b>
30.	Status of maintenance of Log Books	<b>Maintained</b>
31.	Status of Laboratory facility	<b>NO</b>

## **STP at Gwalior**



**Primary treatment unit**



**Treated water storage pond**



**Waste Stabilization Pond overflow**



**Treated water outlet**

## **5.0 STP at Sadawal Village in Ujjain**

### **Observation**

Ujjain, the city of religion & pilgrims has population of around 5 lacs (census 2011); to treat the sewer, Public Health Engineering Department has constructed 52.74 MLD capacity Waste Stabilization Pond technology based STP in year 2003 at Sadawal village and handed over to Nagar Nigam, Ujjain in 2004 for operation & maintenance.

- Unit has 7 pumping stations to pump the sewage in collection tank followed by aerobic pond (02 nos.) treatment. The supernatant of aerobic pond get treated in facultative pond (02 nos.) followed by maturation pond (04 nos.). The treated sewer is used in agricultural activities carried out in 42 acres area. Plant has no such nomenclature and boundary wall.
- It was seen that due to irregularities in cleaning the sludge of inlet storage pond, huge water hyacinth has grown all over the pond. Improper sludge collection is in practice.
- Plant is not maintaining logbook to record the operational status of various units of treatment plant.
- Unit don't have its own laboratory to analyse the quality of treated or untreated sewer; however it was informed that samples are collected and analyzed in PHED laboratory.
- No plantation was observed in and around the sewage storage pond

### **Suggestions**

- To obtain the consent to operate from MPPCB under Water (P&CP) Act, 1974.
- To chlorinate the sewer before discharge to meet the prescribed norms of discharge.
- To stop discharging sewer in River Kshipra.
- To name the STP and boundary wall the area to stop transpassing of unauthorized individuals.
- To concrete the internal roads and scrap the bottom sludge on regular interval to maintain the performance of WSP.
- To install flow meter devices at inlet & outlet point.



### **Detailed information of STP Sadawal, Ujjain**

<b>1.</b>	<b>Name / Location of STP</b>	<b>:</b>	<b>Sewage Treatment Plant Village Sadawal Ujjain (MP)</b>
<b>2.</b>	<b>Process of Sewage Treatment</b>	<b>:</b>	<b>Waste Stabilization pond Waste Stabilization Pond ( 6 Nos) Oxidation Pond (2 Nos)</b>
<b>3.</b>	<b>Flow sheet of STP (to be attached)</b>	<b>:</b>	<b>Enclosed</b>
<b>4.</b>	<b>Designed Capacity / day</b>	<b>:</b>	<b>52.74 MLD</b>
<b>5.</b>	<b>Actual Treatment</b>	<b>:</b>	<b>50 MLD</b>
<b>6.</b>	<b>Raw Sewage Characteristics</b>	<b>:</b>	<b>CPCB Report</b>
	pH		<b>8.01</b>
	TDS		<b>678</b>
	TSS		<b>272</b>
	COD		<b>287</b>
	BOD		<b>41</b>
	Ammonical Nitrogen (as NH <sub>3</sub> )		<b>1.08</b>
	Total Kjehdal Nitrogen (TKN)		<b>28</b>
<b>7.</b>	<b>Primary Settling Tank</b>	<b>:</b>	<b>Not Applicable</b>
<b>8.</b>	<b>Aeration Tank</b>	<b>:</b>	<b>Not Applicable</b>
<b>9.</b>	<b>Secondary Settling Tank</b>	<b>:</b>	<b>Not Applicable</b>
<b>10.</b>	<b>A. Activated Sludge Process</b>	<b>:</b>	<b>Not Applicable</b>
	<b>B. UASB</b>	<b>:</b>	<b>Not Applicable</b>
<b>11.</b>	<b>Final Effluent Quantity</b>	<b>:</b>	<b>CPCB Report</b>
	pH		<b>8.82</b>
	TDS		<b>525</b>
	TSS		<b>88</b>
	COD		<b>74</b>
	BOD		<b>9.0</b>
	Ammonical Nitrogen (as NH <sub>3</sub> )		<b>0.5</b>
	Total Kjehdal Nitrogen (TKN)		<b>8.0</b>
<b>12.</b>	<b>Sludge Thickener</b>	<b>:</b>	<b>Not Applicable</b>
<b>13.</b>	<b>Sludge Digesters</b>		<b>Not Applicable</b>
<b>14.</b>	<b>Biogas produced, if any and its composition</b>		<b>No</b>
<b>15.</b>	<b>Operational status of gas utilization</b>		<b>NA</b>
<b>16.</b>	<b>Power generation , if any</b>		<b>Raw sewage was sent through open drain, no power was required for operation of STP</b>
<b>17.</b>	<b>Point of treated sewage disposal (river / lake / irrigation / land and disposal / pisciculture / aquaculture / any other)</b>		<b>River Kshipra</b>



<b>18.</b>	Bypass arrangement of STPS, if any	<b>No</b>
<b>19.</b>	Method of Sludge disposal and status (Satisfactory / Unsatisfactory)	<b>Unsatisfactory</b>
<b>20.</b>	Operation and maintenance of Sewage Treatment Plant (Satisfactory / Unsatisfactory)	<b>Satisfactory</b>
<b>21.</b>	Agency for operation and maintenance of Sewage Treatment Plant	<b>P.H.E.N.P.N, Ujjain</b>
<b>22.</b>	Operation through Sub Contractor , if any	<b>No</b>
<b>23.</b>	Power requirement	<b>Only for street light</b>
<b>24.</b>	Status of power availability for uninterrupted and continuous running of STP	<b>Continuous</b>
<b>25.</b>	Standby arrangement for power, if any	<b>DG set 11 Nos 100 KVA – 250 KVA</b>
<b>26.</b>	Status of skilled / Trained Manpower	<b>6 (Unskilled)</b>
<b>27.</b>	Annual expenditure on O & M & STP	<b>1.25 Crore</b>
<b>28.</b>	Consent from State Pollution Control Board / Pollution Control Committee or Not	<b>No</b>
<b>29.</b>	Volume of industrial waste being mixed in sewage , if any	<b>No</b>
<b>30.</b>	Status of maintenance of Log Books	<b>Yes (only pump record)</b>
<b>31.</b>	Status of Laboratory facility	<b>Laboratory of Public Health Engineering (PHE) are using for analysis of sewage quality</b>

## **Sewage Treatment Plant (STP) at Ujjain (MP)**



**Raw Sewage Collection Tank**

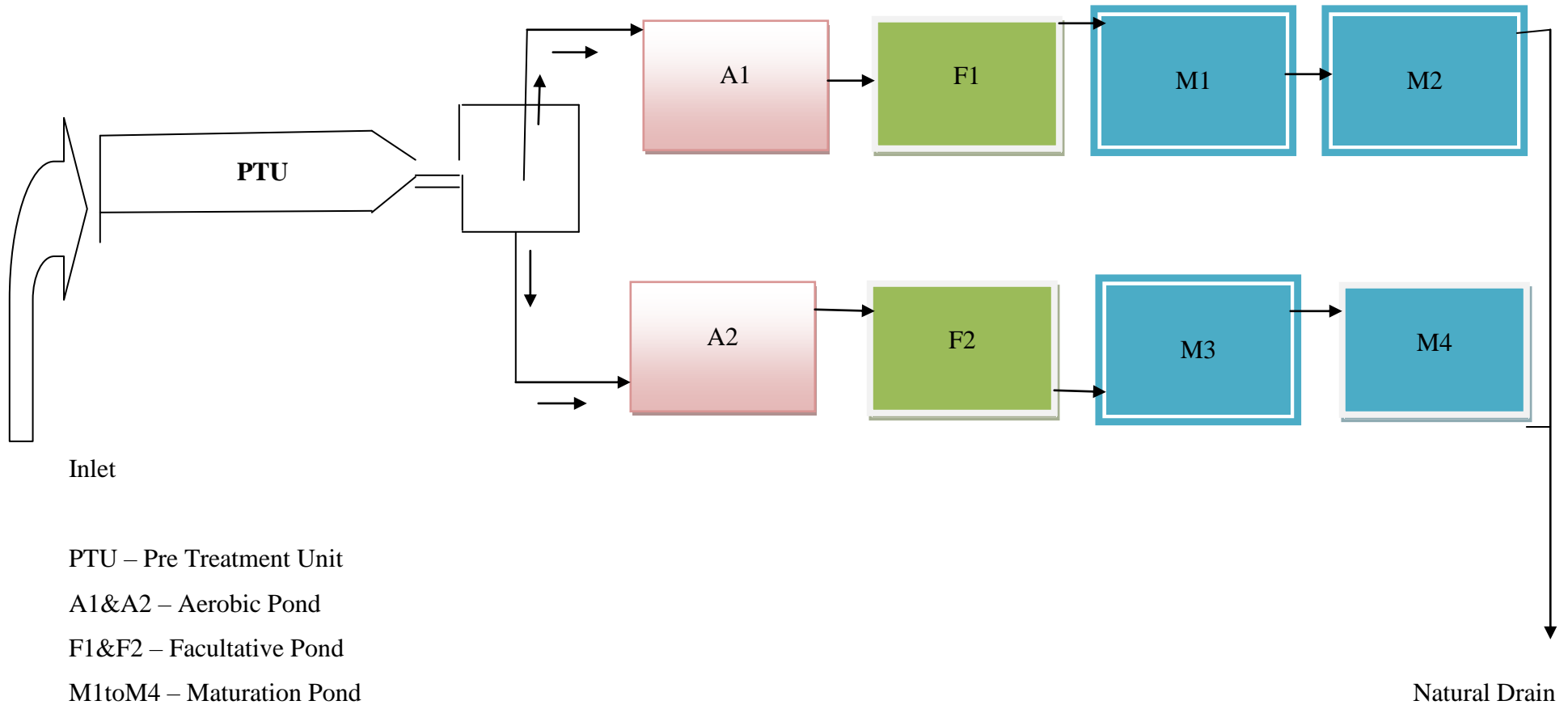


**Raw sewage Inlet Pond**



**Treated water collection ponds**

## Flow Diagram of 52.74 MLD STP (Waste Stabilization Pond) at Sadaval in Ujjain(MP)



## **6.0 STP at Vidisha (MP)**

### **Observation**

- a. State Public Health Engineering Department has constructed 7.2 MLD capacity STP based on Karnal technology and handed over to Nagar Palika Parisad, Vidisha after successful completion of trial run on April 16, 2008.
- b. Under kernel technology treatment, unit has constructed 25 blocks each of 2500M<sup>2</sup> area. The capacity of each block is of 544 numbers of tree. Unit has grown 7500 tress against its capacity of 13600.
- c. Unit has no facility of laboratory to analyze the quality of treatment.
- d. Based on the High Respiration Trans-evaporation System (HRTS) about 500M<sup>3</sup> waste water per hectare per day can be applied for treatment. Which states that unit needs to increase its treatment area and number of Eucalyptus trees to treat the total sewage of Vidisha i.e. around **15MLD**.

### **Suggestion**

- To obtain consent to operate under Water (P&CP) Act 1974.
- To increase the area of treatment to accommodate total sewer generation to get treatment.
- To stop discharging untreated wastewater in River Betwa against the prescribed discharge norms.
- To provide lighting arrangement in and around the site & concrete the roads.
- To augment the storage capacity of treated sewage storage lagoon.
- To install flow meter devices at inlet & outlet point.

### Detailed information of STP Vidisha

<b>1.</b>	<b>Name / Location of STP</b>	<b>:</b>	<b>Jatrapura Road, Shamshanghat Vidisha (MP) - 464 001</b>
<b>2.</b>	<b>Process of Sewage Treatment</b>	<b>:</b>	<b>Karnal Technology based</b>
<b>3.</b>	<b>Flow sheet of STP (to be attached)</b>	<b>:</b>	<b>----</b>
<b>4.</b>	<b>Designed Capacity / day</b>	<b>:</b>	<b>7.2 MLD</b>
<b>5.</b>	<b>Actual Treatment</b>	<b>:</b>	<b>15 KLD</b>
<b>6.</b>	<b>Raw Sewage Characteristics</b>	<b>:</b>	<b>CPCB Report</b>
	pH		<b>7.0</b>
	TDS		<b>992</b>
	TSS		<b>54</b>
	COD		<b>176</b>
	BOD		<b>78</b>
	Ammonical Nitrogen (as NH <sub>3</sub> )		<b>14.01</b>
	Total Kjeldal Nitrogen (TKN)		<b>30</b>
<b>7.</b>	<b>Primary Settling Tank</b>	<b>:</b>	<b>Not Applicable</b>
<b>8.</b>	<b>Aeration Tank</b>	<b>:</b>	<b>Not Applicable</b>
<b>9.</b>	<b>Secondary Settling Tank</b>	<b>:</b>	<b>Not Applicable</b>
<b>10.</b>	<b>A. Activated Sludge Process</b>	<b>:</b>	<b>Not Applicable</b>
	<b>B. UASB</b>	<b>:</b>	<b>Not Applicable</b>
<b>11.</b>	<b>Final Effluent Quantity</b>	<b>:</b>	<b>CPCB Report</b>
	pH		<b>8.8</b>
	TDS		<b>908</b>
	TSS		<b>10</b>
	COD		<b>148</b>
	BOD		<b>23</b>
	Ammonical Nitrogen (as NH <sub>3</sub> )		<b>0.33</b>
	Total Kjeldal Nitrogen (TKN)		<b>5.0</b>
<b>12.</b>	<b>Sludge Thickener</b>	<b>:</b>	<b>Not Applicable</b>
<b>13.</b>	<b>Sludge Digesters</b>		<b>Not Applicable</b>
<b>14.</b>	<b>Biogas produced, if any and its composition</b>		<b>Not Applicable</b>
<b>15.</b>	<b>Operational status of gas utilization</b>		<b>Not Applicable</b>
<b>16.</b>	<b>Power generation , if any</b>		<b>Not Applicable</b>
<b>17.</b>	<b>Point of treated sewage disposal (river / lake / irrigation / land and disposal / pisciculture / aquaculture / any other)</b>		<b>Treated sewage stored in storage tank and some quantity are being use for irrigation purposes</b>
<b>18.</b>	<b>Bypass arrangement of STPS, if any</b>		<b>No</b>
<b>19.</b>	<b>Method of Sludge disposal and status (Satisfactory / Unsatisfactory)</b>		<b>No sludge was generated</b>
<b>20.</b>	<b>Operation and maintenance of Sewage Treatment Plant (Satisfactory / Unsatisfactory)</b>		<b>Satisfactory</b>

<b>21.</b>	Agency for operation and maintenance of Sewage Treatment Plant	<b>Nagar Palika Parisad, Vidisha</b>
<b>22.</b>	Operation through Sub Contractor , if any	<b>No</b>
<b>23.</b>	Power requirement	<b>Installed 11 KVA transformer</b>
<b>24.</b>	Status of power availability for uninterrupted and continuous running of STP	<b>-----</b>
<b>25.</b>	Standby arrangement for power, if any	<b>Yes, DG set 11 KVA capacity</b>
<b>26.</b>	Status of skilled / Trained Manpower	<b>Yes</b>
<b>27.</b>	Annual expenditure on O & M & STP	<b>RS. 3,00,000 per year</b>
<b>28.</b>	Consent from State Pollution Control Board / Pollution Control Committee or Not	<b>Not obtained</b>
<b>29.</b>	Volume of industrial waste being mixed in sewage , if any	<b>No</b>
<b>30.</b>	Status of maintenance of Log Books	<b>Logbook maintained</b>
<b>31.</b>	Status of Laboratory facility	<b>No</b>

## **STP of 7.2 MLD at Vidisha (MP)**



**Raw Sewage Collection Tank**



**Treatment process**

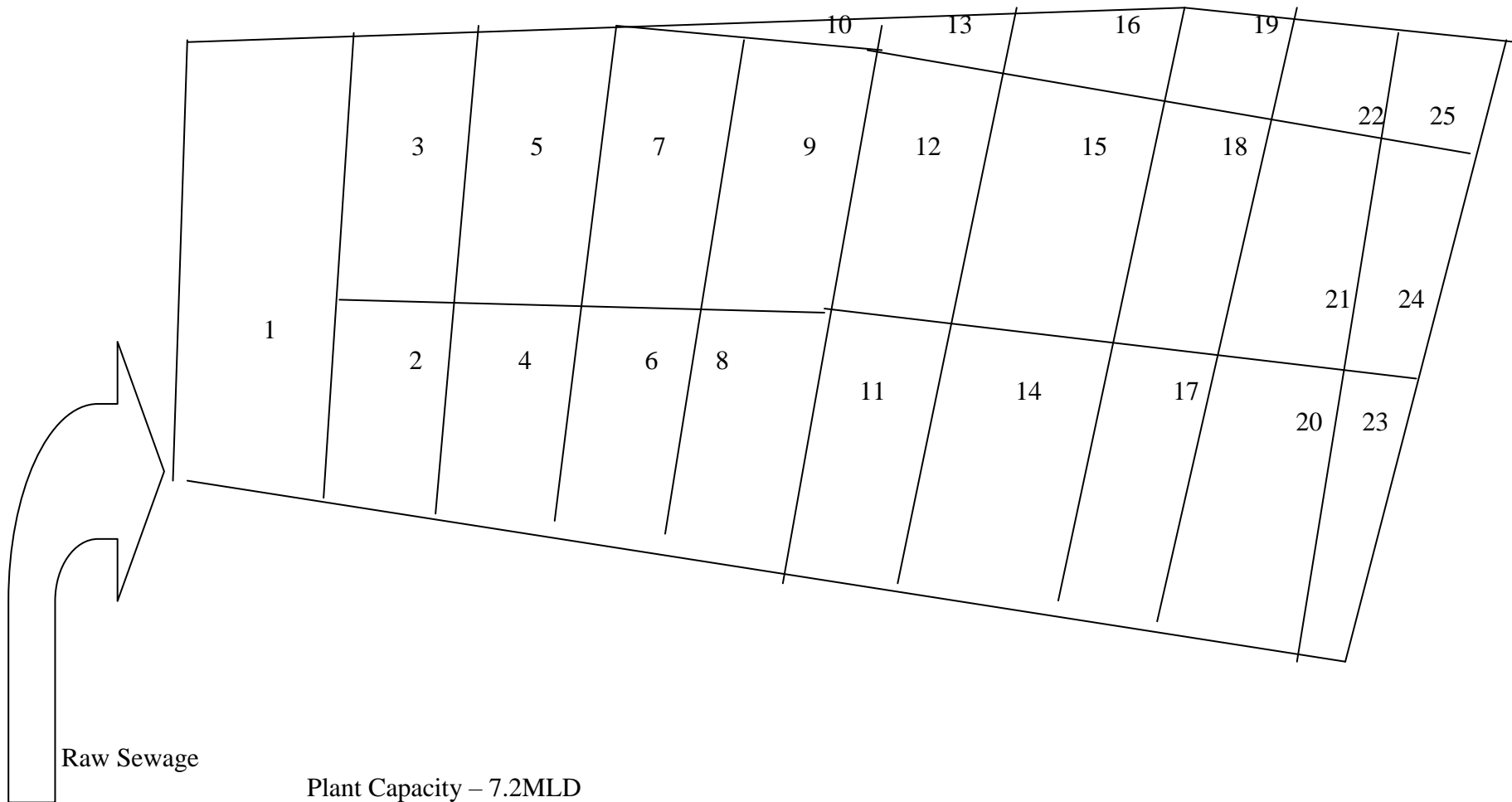


**Treatment process by Eucalyptus plant**



**Treated water storage lagoon**

## Flow Diagram of 7.2 MLD STP (Karnal Technology), Vidisha, MP



Plant Capacity – 7.2MLD  
Total Area – 6.66 Hectare  
Total Blocks – 25 Nos. (Area 50 x50 meter each)  
Per Block plant capacity- 544 nos



## **7.0 STP at Jabalpur city of 0.15 MLD**

### **Observation**

- Municipal Corporation Jabalpur has constructed 150KLD capacity of STP to prevent mixing in the River Narmada and treat the sewage generated from Gwarighat residential area. The annual maintenance of plant is carried out by M/s Jalshree Corporation, Pune.
- The STP is very small and compact size, at the time of visit it was operated satisfactory however back wash water management shall be improved which is generated during back wash of SF and MGF. The STP consists of bio-reactor, sludge settling followed by pressure sand filter and granulated media filter.
- No by-pass of sewage observed as raw sewage is being pumped from the local sewer line/sump located at Gwari ghat.
- The sludge is collected from filter section is being used for gardening purpose in Gwari garden which is being maintained by Nagar Nigam itself.
- Most of the waste water is being used for flushing in Sulabh complex located at the Gwari Narmada ghat. Partial quantity of the treated water is used for horticulture purpose as informed by the representative of the Nagar Nigam, Jabalpur.

### **Suggestion**

1. To obtain consent to operate under Water (P&CP) Act 1974 from MPPCB.
2. To stop discharging of city untreated waste water in river Narmada
3. SF and MGF back wash water management system should be improved

## Detailed information of STP Gwarighat, Jabalpur

1.	Name / Location of STP	:	Gwari Ghat STP, Jabalpur (MP)	
2.	Process of Sewage Treatment	:	The STP consists of Bio-reactor with diffused air system followed by suspended solid settler, sand filter amd MGF and UV disinfection and final treated water is being used for toilet flushing located at Gwari Ghat.	
3.	Designed Capacity / day	:	STP designed for treatment of sewage 150 M <sup>3</sup> /day.	
4.	Actual Treatment	:	120 M <sup>3</sup> to 130 M <sup>3</sup> is being treated per day.	
5.	Raw Sewage Characteristics	:	CPCB Report	
6.	pH COD BOD TSS NH <sub>3</sub> -N Total Nitrogen Fecal Coli form Total Coli form		pH	6.80
			COD	140.61
			BOD	51.11
			TSS	142
			NH3-N	0.536
			Total Nitrogen	7.80
			Feacal Coliform	TNTC
			Total Coliform	TNTC
		7.	Primary Settling Tank	:
8.	Aeration Tank	:	The bio-reactor of STP is combination of homogination cum diffused aeration	
9.	Secondary Settling Tank	:	Not Applicable	
10	A. Activated Sludge Process	:	Not Applicable	
	B. UASB	:	Not Applicable	
11	Final Effluent Quantity	:	CPCB report	
12	pH, COD, BOD, TSS, NH <sub>3</sub> -N, Total Nitrogen, TC, FC		Parameters	Result in mg/L
			pH	6.90
			COD	15
			BOD	06
			TSS	06
			NH3-N	0.56
			Total Nitrogen	2.80
			Feacal Coliform	TNTC
			Total Coliform	TNTC
13	Sludge Thickener		Not applicable	
14	Sludge Digesters		Not applicable	
15	Biogas produced, if any and its composition		Not applicable	
16	Operational status of gas utilization Power generation , if any		Not applicable	
17	Point of treated sewage disposal (river / lake / irrigation / land and disposal / pisciculture / aquaculture / any other)		Most of the waste water is being used for flushing in Shulabh complex located at the Gwari Narmada ghat. Partial quantity of the treated water is used for	

		horticulture purpose as informed by the representative of the Nagar Nigam, Jabalpur.
18	By pass arrangement of STPS, if any	As the raw sewage is being pumped from the local sewer line/sump located at Gwari ghat hence such type of bypass is not made.
19	Method of Sludge disposal and status (Satisfactory / Unsatisfactory)	The sludge is collected from filter section is being use for gardening purpose in Gwari garden maintained by Nagar Nigam itself.
20	Operation and maintenance of Sewage Treatment Plant (Satisfactory / Unsatisfactory)	The STP is very small and compact size, at the time of visit it was operated satisfactory however back wash water management shall be improved which is generated during back wash of SF and MGF.
21	Agency for operation and maintenance of Sewage Treatment Plant	Nagar Nigam has been given O&M contract to <b>M/s Jalshree Corporation</b> 1467 Sadashiv Peth Opp. S. P. College Pune.
22	Operation through Sub Contractor	---
23	Power requirement	-----
24	Status of power availability for un-interrupted and continuous running of STP	Power supply by MPEB.
25	Standby arrangement for power	NA
26	Status of skilled / Trained Manpower	The principal supplier company has deputed 02 well trained technical person for daily O&M of the STP and attained the minor trouble shooting.
27	Annual expenditure on O & M & STP	Approx. 12 Lakh/Annum.
28	Consent from State Pollution Control Board / Pollution Control Committee or not	Not obtained so far.
29	Volume of industrial waste being mixed in sewage , if any	Nil
30	Status of maintenance of Log Books	Maintained properly and available for verification.
31	Status of Laboratory facility	Not provided as the size of the STP is very small however SPCB collect samples as per there schedule.

**0.15 MLD STP, Gwarighat, Jabalpur**



**View of the sewage collection pit**



**View of the fabricated STP**



**Top view of the fabricated STP**



**Flow meter**

## **8. Inspection & Monitoring of STPs in Rajasthan**

Zonal Office, Bhopal conducted performance evaluation of **12** operating STPs of Rajasthan state during June to September 2015. The remaining 02 operating STPs shall be monitored in October 2015. The list of STPs inspected along with installed capacity, year of commissioning etc., is compiled at **Table 5**. During the visit; the technical details of STPs were verified and wastewater samples were collected from the inlet and final outlet for performance evaluation. The samples were analyzed as per the standard methods in the Zonal Office Laboratory. The percentage removal and compliance status of monitored STPs are depicted at **Table 6 & Table 7** respectively. The detailed inspection reports including analysis results, photographs, observations and suggestions are as follows.

**Table 5: Details of Inspected STPs in Rajasthan**

S. No	City/ town	STP Location	Project of	Year of commission	STP installed Capacity MLD	Technology	Consent status
1	Jaipur	Delawas-I	ADB	2006	62.5	ASP	Applied
2		Delawas-II	ADB	2011	62.5	ASP	
3		Jaisinghpura Khor	ADB	2011	50	ASP	Applied
4		Amer Road	ADB	2006	27	ASP	Applied
5		Jawahar circle	RUIDP	2010	1.0	MBBR	Not obtained
6		JDA Ramnivas Garden	RUIDP	2014	1.0	MBBR	Not obtained
7		Vidyadhar nagar	RUIDP	2014	1.0	MBBR	Not obtained
8		Gajodharpura	RUIDP	2013	30	ASP	Not obtained
9	Sawai Madhopur	SawaiMadhopur	RUIDP	2014	10	WSP	Not obtained
10	Jodhpur	Salawas	Nagar Nigam	2011	50	ASP	Applied
11		Nandri	Nagar Nigam	2004	20	WSP	Applied
12	Bhilwara	Kewara	Jindal Saw ltd	2012	10(5.5+4.5)	SBR	Applied for renewal

**Table 6: Performance of Monitored STPs in Rajasthan**

S.No	Name of STP	Sampling location	pH	TSS	COD	BOD	NH <sub>3</sub> -N
1	Delawas -I	Inlet	7.74	375	783	262	35
		Out let	7.62	62	171	52	13
		% removal	-	83	78	80	63
2	Delawas -II	Inlet	7.74	375	783	262	35
		Out let	7.73	33	152	46	15
		% removal	-	91	80	82	57
3	Jaisinghpura Khor	Inlet	7.55	626	319	99	28
		Out let	7.94	32	57	17	2.5
		% removal	-	95	82	83	91
4	Amer Road	Inlet	7.96	303	844	262	28
		Out let	7.81	34	167	50	10
		% removal	-	89	80	81	64
5	Jawahar Circle	Inlet	7.68	306	1102	366	30
		Out let	7.63	28	34	11	0.9
		% removal	-	91	97	97	98
6	Ramniwas Garden	Inlet	7.93	228	600	193	30
		Out let	8.1	49	49	15	0.5
		% removal	-	78	92	92	98
7	Vidyadhar Nagar	Inlet	7.69	955	1535	490	35
		Out let	7.63	80	76	23	0.6
		% removal	-	92	95	95	98
8	Gajodharpura	Inlet	7.9	451	540	173	37
		Out let	8.15	89	80	26	10
		% removal	-	80	85	85	73
9	Sawai Madhopur	Inlet	7.2	28	182	83	13
		Out let	Outlet not found				
10	Salawas	Inlet	7.69	336	428	200	3.57
		Out let	6.82	10	62	17	0.34
		% removal	-	97	85	91	90
11	Nandri	Inlet	7.32	460	972	636	5.38
		Out let	6.68	34	59	16	0.34
		% removal	-	92	94	97	93
12	Kewara, Bhilwara	Inlet	7.30	176	185	30.66	8.59
		Out let	7.25	68	28	1.94	1.44
		% removal	-	61	85	94	83

Note: all values are in mg/l except pH.



**Table 7: Compliance Status of Monitored STPs in Rajasthan****(STPs final outlet samples analysis results)**

S.No	STP's	Date of Visit	pH	TSS	COD	BOD	NH <sub>3</sub> -N
1	Delawas-I	24.06.2015	7.62	62	171	52	13
2	Delawas-II	24.06.2015	7.73	33	152	46	15
3	Jaisinghpura Khor	24.06.2015	7.94	32	57	17	2.5
4	Amer Road	24.06.2015	7.81	34	167	50	10
5	Jawahar Circle	24.06.2015	7.63	28	34	11	0.9
6	Ramnivas Garden	24.06.2015	8.1	49	49	15	0.5
7	Vidyadhar Nagar	25.06.2015	7.63	80	76	23	0.6
8	Gajodharpura	25.06.2015	8.15	89	80	26	10
9	SawaiMadhopur	28.06.2015	-	-	-	-	-
10	Salawas	09.08.2015	6.82	10	62	17	0.34
11	Nandri	10.08.2015	6.68	34	59	16	0.34
12	Kewara, Bhilwara	05.09.2015	7.25	68	28	1.94	1.44
<b>Prescribed limits</b>			<b>5.5- 9.0</b>	<b>100</b>	<b>250</b>	<b>30</b>	<b>50</b>

**9.0 Details of STPs in Jaipur:-**

RUIDP has constructed conventional STPs at Jalmahal (27 MLD capacity) for treating the sewage from Bramhapuri area, Delawas unit-I&II (2x62.5 MLD) for treating the Jaipur south wastewater including Sanganer Industrial wastewater, Jaisinghpura Khor (50 MLD capacity) for treating the sewage from Jaipur city and 30 MLD STP at Gajodharpura for Jaipur west. The STP was constructed by RUIDP and thereafter handed over to JMC (Jaipur Municipal Corporation) for operation. The Jaipur Development Authority (JDA) has also constructed 1MLD STP each at Jawahar circle, Ramnivas garden & Vidyadhar Nagar and 7.5 MLD capacity TTP (Tertiary Treatment Plant) attached to 27 MLD plant at Jalmahal. The plant was being run by RUIDP and treated water is released to Jalmahal. Two STPs are under construction and two proposed in Jaipur city.

*The approximate population of the Jaipur city is 35 lakh. As per the information supplied by the RUIDP, Jaipur the total water supplied 135 LPCD. Considering this figure the total wastewater generation would be approx. 378MLD. The existing capacity of STP operating in the city is only 235 MLD. The existing capacity of STPs is only 62 % of the requirement of city. The new STPs of having 143 MLD capacity are required to commission in the urban area to treat the generated sewage and save the water environment in and around the city.*

**Table 8. List of STPs in Jaipur and their compliance status**

S No	Name of the STP	Treatment system provided	Designed Capacity in MLD	Actual flow in MLD	Source	Disposal	Compliance status
1	Amer Road	ASP	27	27	Domestic & industrial	Jalmahal lake	Not Complying
2	Delawas-I	ASP followed by sludge digester	62.5	62.5	Domestic & industrial	Amanishah Nallah	Not complying
3	Delawas-II		62.5	62.5	Domestic & industrial	Amanishah Nallah	Not complying
4	Jaisingh Khor	ASP	50	10	Domestic & industrial	Nallah	complying
5	Gajodharapura	ASP	30	11	Domestic	Nallah	complying
6	Jawahar Circle	MBR	1.0	1.0	Domestic	Garden	complying
7	Vidyadhar Nagar	MBR	1.0	1.0	Domestic	Garden	complying
8	Ramniwas garden	MBR	1.0	1.0	Domestic	Garden	complying
<b>Total capacity</b>			<b>235</b>				

## **9.1 STP at Delawas (Unit-I & II) in Jaipur**

### **Observation**

- There are two STPs of 62.5 MLD capacity each exists in the same premises. Both the STPs were constructed and owned by Rajasthan Urban Infrastructure Development (RUIDP). Unit I was commissioned on 15.02.2006 and unit II in March 2011. The STP were constructed by RUIDP and thereafter handed over to JMC (Jaipur Municipal Corporation) for operation. Both STPs are constructed for treating the sewage from southern part of Jaipur city including Sanganer industrial area effluent. It was informed and observed that some Industrial effluent also comes to STP along with domestic waste.
- The STPs covers the Southern drainage which carries almost 75 % of Jaipur City sewage into/ towards Amanisha drain which finally joins River Dhund. These STPs are completely dedicated for this zone.
- Both the STPs are having similar type of treatment system. The treatment system consisting of coarse & fine screens, grit separators, primary clarifiers, diffused aeration, secondary clarifiers, sludge thickener, centrifuge, sludge digesters and gas holders. The gases are being used for power generation to run the blower for supplying of the air in to the diffused aeration system.



- iv. During visit, STP Delawas unit I & II were in operation with full capacity. It was observed that about 30% of wastewater has been by-passed in to drain. The treated water was being discharged in to the Amanishah Nallah. As informed by the operator that some quantity of industrial effluent also mixing with the sewage from Sanganer Industrial Area. Presently Operation and maintenance done by M/s VA TECH WABAG Ltd. Chennai.
- v. Excess sludge generated from clarifiers after thickening is digested an aerobically in closed dome type digester and biogas produced. The STPs have two 500 KVA gas generator sets for power generation with digester gas for running the diffused aeration and other instruments. About 3000 m<sup>3</sup> bio-gas produced per digester. Lot of noise was noticed at the time of inspection. DG sets are not available in both the plants and electricity Board power connection is also available. Presently utilizing the power from gas engines.
- vi. The STP has developed common laboratory facilities for analyzing the routine parameters like PH, BOD, COD and TSS in the premises. Records were maintained for the analysis done in the laboratory. It was informed that the officials from Regional office, Jaipur (South) were collecting the samples once in a month for compliance verification.
- vii. The consent under Water Act expired and the operator had applied for renewal. The consent renewal is still pending with RSPCB for both the units.
- viii. The STPs were not planted the trees in the premises except lawn in front of the office and generator rooms.
- ix. Sludge dewatering is achieved by centrifuging of sludge. It is informed that the solid waste generated from these activities is being lifted by the nearby farmers for using as manure.
- x. Most of the system in the STP was working satisfactorily except the sludge disposal.
- xi. Plant was complying with norms prescribed by the RSPCB except BOD contents which was marginally higher.
- xii. The inlet is common for both STPs. the Inlet and outlet samples were collected from unit-I & II separately for verifying the efficiency of STPs. The outlet values of unit-I are found to be pH, BOD, COD and TSS are 7.62, 52 mg/L, 171 mg/L and 62 mg/L and outlet values of unit-II found to be pH, BOD, COD and TSS are 7.73, 46 mg/L, 152 mg/L and 33 mg/L as against the limits of 5.5 -9.0, 30 mg/L, 250 mg/L and 100 mg/L, respectively. All the values are within the limits except BOD for both the units.

## **Suggestions**

- i. Consent under Water Act should be renewed from RSPCB without any delay.
- ii. The authority should construct the tertiary treatment plant for reusing the treated wastewater instead of letting in to the wastewater drain.
- iii. Holding tank should be constructed for storing the treated wastewater to reuse in organized manner for plantation, gardening, irrigation etc. after disinfection.
- iv. The primary treatment facility shall be installed for streams carrying wastewater of dying /cloth washing units of Sanganer and other residential localities.
- v. The flare stacks should be checked regularly and adequate safety measures should be provided for the gas holding tanks to prevent accidents.
- vi. Acoustic enclosures should be provided at the gas generators and blowers for control of noise level.

### Detailed information of Delawas, Phase-I STP, Jaipur

1.	Name / Location of STP	:	62.5MLD STP, Phase-I, Delawas, Pratap Nagar, Sector-28, Jaipur
2.	Process of Sewage Treatment	:	Activated Sludge Process
3.	Flow sheet of STP (to be attached)	:	----
4.	Designed Capacity / day	:	62.5MLD
5.	Actual Treatment	:	62.5MLD
6.	Raw Sewage Characteristics	:	<b>STP Report</b>
	pH		7.12
	TSS		620mg/l
	COD		776mg/l
	BOD		330mg/l
	NH <sub>3</sub> -N		32mg/l
	Total Nitrogen		56mg/l
7.	Primary Settling Tank	:	
	Primary Settling Tank Volume M <sup>3</sup>		<b>1302M<sup>3</sup></b>
	Settling Surface Area M <sup>2</sup>		----
	Weir Length ( m)		<b>81.05m</b>
	Retention Period		<b>2HRS</b>
	PST outlet TSS, BOD, COD (mg/l)		<b>TSS-240mg/l, BOD-180mg/l, COD-450mg/l</b>
	Under flow Solids concentration mg/l or %		<b>4%</b>
	Actual Primary Sludge Production rate (Flow rate M <sup>3</sup> / hr multiplied by hr / day)		<b>550m<sup>3</sup>/day</b>
	Availability of Mechanical Scraper		<b>Mechanical Scraper</b>
8.	Aeration Tank	:	
	Aeration Tank Volume M <sup>3</sup>		15660 m <sup>3</sup>
	Retention period		6.01Hrs
	Mixed Liquor MLSS & MLVSS mg / l		2500 & 2000mg/l
	Aeration Capacity KW or HP		Each 100HP (5 Nos)
	Rated Aeration Capacity Kg / KW hr		3540M <sup>3</sup> /hr each
9.	Secondary Settling Tank	:	
	Secondary Settling Tank Volume m <sup>3</sup>		4396 m <sup>3</sup>
	Settling Surface Area m <sup>2</sup>		---
	Retention Period		2.15HRS
	Weir length m		229.96 m
	Retention flow rates m <sup>3</sup> / Hr or m <sup>3</sup> / day		31250 m <sup>3</sup> /day
	Return flow solids (TSS) concentration		8000mg/l
10.	A. Activated Sludge Process	:	
	Waste Sludge generation (Flow rate m <sup>3</sup> / hr multiplied by hr / day)		650M <sup>3</sup> /Day
	Waste Sludge Solids (TSS) concentration		8000 mg/l
	ASP outlet TSS, BOD		TSS-2500mg/l, BOD-NA
	B. UASB	:	<b>NO</b>

<b>11.</b>	Final Effluent Quantity	<b>:</b>	<b>STP Report</b>
	pH TSS COD BOD		7.68 40 mg/l 170 mg/l 27 mg/l
<b>12.</b>	Sludge Thickener	<b>:</b>	
	Volume m <sup>3</sup> Thickening surface m <sup>3</sup> Underflow Solids Concentration mg/L Actual thickened sludge production Rate (Flow rate, m/hr multiplied by hr / day)		530 M <sup>3</sup> - 8% 420 M <sup>3</sup> /Day
<b>13.</b>	Sludge Digesters		
	Digester Volume m <sup>3</sup> Thickening Sludge BOD mg/L COD mg/L Actual digester sludge production rate (Flow rate m <sup>3</sup> / hr multiplied by hr/ d)		3100 M3 x 2 NOs ----- 300 M3/day in 2 digester
<b>14.</b>	Biogas produced, if any and its composition		3000 per digester
<b>15.</b>	Operational status of gas utilization		Power generation
<b>16.</b>	Power generation , if any		----
<b>17.</b>	Point of treated sewage disposal (river / lake / irrigation / land and disposal / pisciculture / aquaculture / any other)		Lake
<b>18.</b>	Bypass arrangement of STPS, if any		Yes
<b>19.</b>	Method of Sludge disposal and status (Satisfactory / Unsatisfactory)		Sludge disposed by using trolley dumped in land provided by JMC
<b>20.</b>	Operation and maintenance of Sewage Treatment Plant (Satisfactory / Unsatisfactory)		Satisfactory
<b>21.</b>	Agency for operation and maintenance of Sewage Treatment Plant		Va Tech Wabag Ltd, Chennai
<b>22.</b>	Operation through Sub Contractor , if any		NO
<b>23.</b>	Power requirement		8756 KW/day
<b>24.</b>	Status of power availability for uninterrupted and continuous running of STP		Presently Electricity board power is utilized, Proposed to utilize the power from gas engine
<b>25.</b>	Standby arrangement for power, if any		NO
<b>26.</b>	Status of skilled / Trained Manpower		Skilled & trained manpower available
<b>27.</b>	Annual expenditure on O & M & STP		50 Lakhs
<b>28.</b>	Consent from SPCB		Under Process
<b>29.</b>	Volume of industrial waste being mixed in sewage , if any		Frequently industrial waste is mixed
<b>30.</b>	Status of maintenance of Log Books		Log book Maintained
<b>31.</b>	Status of Laboratory facility		State of art laboratory available

### Detailed information of Delawas, Phase-II STP, Jaipur

1.	Name / Location of STP	:	62.5MLD STP, Phase-II, Delawas, Pratap Nagar, Sector-28, Jaipur
2.	Process of Sewage Treatment	:	Activated Sludge Process
3.	Flow sheet of STP (to be attached)	:	----
4.	Designed Capacity / day	:	62.5MLD
5.	Actual Treatment	:	62.5MLD
6.	Raw Sewage Characteristics	:	<b>STP Report</b>
	pH TSS COD BOD NH <sub>3</sub> -N Total Nitrogen		7.12 620mg/l 776mg/l 330mg/l 32mg/l 56mg/l
7.	Primary Settling Tank	:	
	Primary Settling Tank Volume M <sup>3</sup> Settling Surface Area M <sup>2</sup> Weir Length ( m) Retention Period PST outlet TSS, BOD, COD  Under flow Solids concentration mg/l or % Actual Primary Sludge Production rate (Flow rate M <sup>3</sup> / hr multiplied by hr / d) Availability of Mechanical Scraper		<b>1302M<sup>3</sup></b> ---- <b>81.05m</b> <b>2HRS</b> <b>TSS-240mg/l, BOD-180mg/l, COD-450mg/l</b> <b>4%</b> <b>550m<sup>3</sup>/day</b>  <b>Mechanical Scraper</b>
8.	Aeration Tank	:	
	Aeration Tank Volume M <sup>3</sup> Retention period Mixed Liquor MLSS & MLVSS mg / l Aeration Capacity KW or HP Rated Aeration Capacity Kg / KW hr		15660 m <sup>3</sup> 6.01Hrs 2500 & 2000mg/l Each 100HP (5 Nos) 3540M <sup>3</sup> /hr each
9.	Secondary Settling Tank	:	
	Secondary Settling Tank Volume m <sup>3</sup> Settling Surface Area m <sup>2</sup> Retention Period Weir length m Retention flow rates m <sup>3</sup> / Hr or m <sup>3</sup> / day Return flow solids (TSS) concentration		4396 m <sup>3</sup> ---- 2.15HRS 229.96 m 31250 m <sup>3</sup> /day 8000mg/l
10.	A. Activated Sludge Process	:	
	Waste Sludge generation (Flow rate m <sup>3</sup> / hr multiplied by hr / day) Waste Sludge Solids (TSS) concentration mg/l ASP outlet TSS, BOD		650M <sup>3</sup> /Day  8000 mg/l TSS-2500mg/l, BOD-NA
	B. UASB	:	<b>NO</b>

<b>11.</b>	<b>Final Effluent Quantity</b>	<b>:</b>	<b>STP Report</b>
	pH TSS COD BOD		7.69 30 mg/l 142 mg/l 26 mg/l
<b>12.</b>	<b>Sludge Thickener</b>	<b>:</b>	
	Volume m <sup>3</sup> Thickening surface m <sup>3</sup> Underflow Solids Concentration Actual thickened sludge production Rate (Flow rate, m/hr multiplied by hr /d)		530 M <sup>3</sup> - 8% 420 M <sup>3</sup> /Day
<b>13.</b>	<b>Sludge Digesters</b>		
	Digester Volume m <sup>3</sup> Thickening Sludge BOD mg/L COD mg/L Actual digester sludge production rate (Flow rate m <sup>3</sup> / hr multiplied by hr/d)		3100 M3 x 2 NOs ----- 300 M3/day in 2 digester
<b>14.</b>	<b>Biogas produced, if any and its composition</b>		3250 per digester
<b>15.</b>	<b>Operational status of gas utilization</b>		CNG Gas Bottling Plant
<b>16.</b>	<b>Power generation , if any</b>		----
<b>17.</b>	<b>Point of treated sewage disposal</b>		Lake
<b>18.</b>	<b>Bypass arrangement of STPS, if any</b>		Yes
<b>19.</b>	<b>Method of Sludge disposal and status (Satisfactory / Unsatisfactory)</b>		Sludge disposed by using trolley dumped in land provided by JMC
<b>20.</b>	<b>Operation and maintenance of Sewage Treatment Plant (Satisfactory /</b>		Satisfactory
<b>21.</b>	<b>Agency for operation and maintenance of Sewage Treatment Plant</b>		Va Tech Wabag Ltd, Chennai
<b>22.</b>	<b>Operation through Sub Contractor</b>		NO
<b>23.</b>	<b>Power requirement</b>		7700KW/day
<b>24.</b>	<b>Status of power availability for uninterrupted and continuous running of STP</b>		Electricity board power is utilized
<b>25.</b>	<b>Standby arrangement for power, if any</b>		NO
<b>26.</b>	<b>Status of skilled / Trained Manpower</b>		Skilled & trained manpower available
<b>27.</b>	<b>Annual expenditure on O &amp; M &amp; STP</b>		72 Lakhs
<b>28.</b>	<b>Consent from State Pollution Control Board / Pollution Control Committee or Not</b>		Under Process
<b>29.</b>	<b>Volume of industrial waste being mixed in sewage , if any</b>		Frequently industrial waste is mixed
<b>30.</b>	<b>Status of maintenance of Log Books</b>		Log book Maintained
<b>31.</b>	<b>Status of Laboratory facility</b>		State of art laboratory available

## STP at Delawas (Unit I & II) in Jaipur



View of the clarifier



aeration tanks



Secondary clarifies



view sludge digesters

## **9.2 STP at Amer Road in Jaipur**

### **Observation**

- i. The RUIDP Jaipur has constructed 27 MLD STP at Jalmahal and managed by JMC (Jaipur Municipal Corporation) for treating the domestic wastewater from the Bramhapuri area. The treated water joins Jalmahal Lake. Presently operation and maintenance done by Dorr–Oliver (Hindustan Dorr-Oliver Limited) Andheri, Mumbai.
- ii. The wastewater received by STP is not only containing domestic waste but it also contains the industrial wastewater being generated by various small scale textile industries operating in this area. Unit has installed infrared microprocessor based flow measuring device at parshal plume.
- iii. The STP consists of inlet chamber, coarse and fine screen separator, grit launder chamber, parshal flume, extended aeration tank (diffusers system), secondary clarifier with skimmer, aerobic sludge digester, sludge thickener and, sludge storage tank, centrifuge unit for dewatering the sludge, sludge drying beds, and these system controlled by PLC system.
- iv. Arrangement made for bypass of the excess untreated wastewater through separate channel. During the visit bypass of sewage was observed.
- v. The STP has no dedicated laboratory for the analysis of wastewater for routine parameters. All the required analysis of wastewater is being done using at the PHED laboratory facility by the contactor staff.
- vi. The facility has one Grit chamber for removing of grit and coarse & fine screens for removing floating materials at the inlet. During the visit floating matter was not observed in the aeration tank.
- vii. Diffused aeration system provided and all the system was in place and all the aeration was in operation. But huge noise was observed at the blower from where atmospheric oxygen sucked and supplied for aeration. Two acoustic enclosures were installed for the control of noise pollution at compressor.
- viii. Installed two nos. of centrifuges for decanting the sludge and the decanted sludge cake is dumped in the sludge drying beds (3 nos.) for giving to farmers for using as manure.
- ix. Colored (red brown) effluent observed in inlet due to dyes used in the blankets and washing these blankets imparted colour. The STP has no facility to trap the dyes. No flow measuring devices installed at the outlet of STP. Log books/ records should be maintained for the operation of STPs, inlet & outlet flows, solid waste generation& its disposal etc.



- x. The treated effluent from 27MLD plant has been sending for treatment in the TTP which is located in the same premises. The 7.8 MLD capacity TTP (Tertiary Treatment Plant) attached to 27 MLD plant at Jalmahal has been managed by Jaipur Development Authority (JDA).The treatment system consisting of collection, flash mixture, settling and wetland treatment. The treated water was being released in to Jalmahal for recreation purpose. The remaining 19.2 MLD from the 27 MLD plant has been discharged in to the Nallah.
- xi. The STP has not provided equalization and holding tanks at the inlet & outlet of STP for storing the treated and untreated effluent in case of emergency.
- xii. The STP has provided DG set for backup power failure to run the biological system without any interruption.
- xiii. Housekeeping was not maintained properly.
- xiv. Samples were collected were from the sewage treatment plant Inlet and outlet and the detailed analysis results are given at Table 2. The outlet values of pH, BOD, COD and TSS are 7.81, 50 mg/L, 167 mg/L and 34 mg/L as against the limits of 5.5 -9.0, 30 mg/L, 250 mg/L and 100 mg/L, respectively. All the values are within the limits except BOD.

### **Suggestions**

- i. Equalization tank should be constructed at the inlet and holding tank for storage of the treated wastewater for utilization in plantation etc.
- ii. The primary treatment facility shall be installed for streams carrying wastewater of dying /cloth washing units.
- iii. Flow meter should be provided at the outlet of STP.
- iv. To construct inlet collection sump before tertiary treatment plant.
- v. The STP should explore the possibility for use of 19.5 MLD treated wastewater in plantation or enhance the capacity of Tertiary Treatment Plant for treatment and use in industrial or cooling purpose instead of letting in to the Jalmahal lake.
- vi. STP should ensure periodic analysis of wastewater from recognized laboratory or develop their own environmental laboratory for the analysis of wastewater with qualified manpower.
- vii. The STP capacity should be augmented to avoid by-passing of excess quantity of wastewater.

### Detailed information of STP Amer Road, Jaipur

1.	Name / Location of STP	:	27MLD STP, Jaipur Nagar Nigam, Brahmpuri, Amer Road
2.	Process of Sewage Treatment	:	Activated Sludge Process
3.	Flow sheet of STP (to be attached)	:	----
4.	Designed Capacity / day	:	27MLD
5.	Actual Treatment	:	27MLD
6.	Raw Sewage Characteristics	:	<b>STP Report</b>
	pH TSS COD BOD		6.5-8.5 600-900mg/l 700-1200mg/l 300-500mg/l
7.	Primary Settling Tank	:	<b>NO primary Settling Tank</b>
8.	Aeration Tank	:	
	Aeration Tank Volume M <sup>3</sup> Retention period Mixed Liquor MLSS & MLVSS mg / l  Aeration Capacity KW or HP Ratted Aeration Capacity Kg / KW hr		15600 m <sup>3</sup> 14Hrs MLSS- 2500-3000 & MLVSS 2300-2500mg/l 8035NM <sup>3</sup> /Hr <b>9872Kg/day</b>
9.	Secondary Settling Tank	:	
	Secondary Settling Tank Volume m <sup>3</sup> Settling Surface Area m <sup>2</sup> Retention Period Weir length m Retention flow rates m <sup>3</sup> / Hr or m <sup>3</sup> / day Return flow solids (TSS) concentration		44 m dia x 3m SWD ---- 4.02HRS ---- 60 m <sup>3</sup> /hr -----
10.	A. Activated Sludge Process	:	
	Waste Sludge generation (Flow rate m <sup>3</sup> / hr multiplied by hr / day) Waste Sludge Solids (TSS) concentration mg/l ASP outlet TSS, BOD		----  0.1% ----
	B. UASB	:	<b>NO</b>
11.	Final Effluent Quantity	:	<b>STP Report</b>
	pH TSS COD BOD		6.5-8.5 <30 mg/l <250 mg/l <20 mg/l
12.	Sludge Thickener	:	
	Volume m <sup>3</sup> Thickening surface m <sup>3</sup> Underflow Solids Concentration mg/L Actual thickened sludge production Rate (Flow rate		-  1% --
13.	Sludge Digesters		Aerobic digester

<b>14.</b>	Biogas produced, if any and its composition	No Biogas generation
<b>15.</b>	Operational status of gas utilization	NA
<b>16.</b>	Power generation , if any	NO
<b>17.</b>	Point of treated sewage disposal (river / lake / irrigation / land and disposal / pisciculture / aquaculture / any other)	7.8MLD to TTP & Remaining in Brahmpuri Nallah
<b>18.</b>	Bypass arrangement of STPS, if any	To sewer line
<b>19.</b>	Method of Sludge disposal and status (Satisfactory / Unsatisfactory)	Solid cake by centrifuge Satisfactory
<b>20.</b>	Operation and maintenance of Sewage Treatment Plant (Satisfactory / Unsatisfactory)	Satisfactory
<b>21.</b>	Agency for operation and maintenance of Sewage Treatment Plant	Jaipur Nagar Nigam
<b>22.</b>	Operation through Sub Contractor , if any	Jaipur Nagar Nigam
<b>23.</b>	Power requirement	6800 KW/month
<b>24.</b>	Status of power availability for uninterrupted and continuous running of STP	Uninterrupted
<b>25.</b>	Standby arrangement for power, if any	NO
<b>26.</b>	Status of skilled / Trained Manpower	Yes, all skilled
<b>27.</b>	Annual expenditure on O & M & STP	136 Lakhs
<b>28.</b>	Consent from State Pollution Control Board / Pollution Control Committee or Not	Applied
<b>29.</b>	Volume of industrial waste being mixed in sewage , if any	Industrial dyes 4MLD
<b>30.</b>	Status of maintenance of Log Books	Log book Maintained
<b>31.</b>	Status of Laboratory facility	Yes

## STP at Amer Road in Jaipur



Inlet to STP



Mechanical screen



Colored effluent in aeration tank



Root zone treatment

### **9.3 STP at Jaisinghpura Khor village in Jaipur**

#### **Observation**

- i. The STP at Jaisinghpura Khor village has 50 MLD capacity .The plant has been constructed and commissioned in 2011 by RUIDP. Presently the STP has been operating by M/s VEE BACK Pvt. Ltd., Chennai.
- ii. The treatment system consisting of coarse & fine screens, grit chamber, primary clarifiers, diffused aeration, secondary clarifiers, sludge thickener, centrifuge, sludge digesters and gas holders.
- iii. During the visit plant was operating with 50% load only. Less quantity of the flow was being received due to improper drainage system. It was observed that lot sand was coming to Inlet of STP due to breakage of the main sewer pipe line. Dyeing Industries effluent also comes to the STP along with domestic wastewater.
- iv. The treated wastewater from the STP was being discharged in the open drain and partly used by the farmers for agricultural purpose.
- v. The STP has no flow meters for inlet and outlet flow. Flow has been measured by using V-notch & parshal flume.
- vi. Records are not being maintained for flow and sludge generation & disposal. It was informed that the sludge was being taken by the formers for using as manure.
- vii. The plant has developed own environmental laboratory for monitoring of routine parameters.
- viii. All the internal roads are made pucca and up keeping of the STP premises were very good. Plantation was not developed in the premises STP.
- ix. During the visit plant was not in fully stabilized condition only 50% of the flow was being received due to improper drainage system.
- x. DG set provided to run the plant during state power cuts. The consent under Water Act expired & applied for renewal of the same to RSPCB.
- xi. Inlet and outlet samples were collected from the STP and the analysis results are given at Table 2. The outlet values of pH, BOD, COD and TSS are 7.94, 17 mg/L, 57 mg/L and 32 mg/L as against the limits of 5.5 -9.0, 30 mg/L, 250 mg/L and 100 mg/L, respectively. All the values are within the limits.

#### **Suggestions**

- i. The authority should construct the tertiary treatment plant for reusing the treated wastewater for industrial as well as agricultural purpose instead of letting in to the wastewater drain.

- ii. Holding tank should be constructed for storing the treated wastewater to reuse for plantation purpose.
- iii. The primary treatment facility shall be installed for streams carrying wastewater of dying /cloth washing units.
- iv. Green belt should be developed in and around the STP boundary.
- v. Proper records should be maintained for inlet and outlet flow by installing on line flow meters at inlet and outlet.
- vi. Records should be maintained for sludge generation and disposal. The sludge has to be stored properly before disposal for using as manure.
- vii. Enclosures should be provided at the gas generators and blowers for controlling the noise pollution.

### Detailed information of STP Jaisinghpura, Jaipur

1.	Name / Location of STP	:	50MLD STP Jaisinghpura Khor, Jaipur
2.	Process of Sewage Treatment	:	Activated Sludge Process
3.	Flow sheet of STP (to be attached)	:	----
4.	Designed Capacity / day	:	50MLD
5.	Actual Treatment	:	Receiving 6MLD
6.	Raw Sewage Characteristics	:	<b>STP Report</b>
	pH		7.02
	TSS		670mg/l
	COD		800mg/l
	BOD		400mg/l
	NH <sub>3</sub> -N		50mg/l
	Total Nitrogen		70mg/l
7.	Primary Settling Tank	:	
	Primary Settling Tank Volume M <sup>3</sup>		<b>2090M<sup>3</sup></b>
	Settling Surface Area M <sup>2</sup>		----
	Weir Length ( m)		<b>71.63m</b>
	Retention Period		<b>2HRS</b>
	PST outlet TSS, BOD, COD (mg/l)		<b>TSS-240mg/l, BOD-180mg/l, COD-450mg/l</b>
	Under flow Solids concentration mg/l or %		<b>4%</b>
	Actual Primary Sludge Production rate (Flow rate M <sup>3</sup> /hr multiplied by hr/d)		<b>493m<sup>3</sup>/day</b>
	Availability of Mechanical Scraper		<b>Mechanical Scraper</b>
8.	Aeration Tank	:	
	Aeration Tank Volume M <sup>3</sup>		12500 m <sup>3</sup>
	Retention period		6.01Hrs
	Mixed Liquor MLSS & MLVSS mg / l		3000 & 2400mg/l
	Aeration Capacity KW or HP		Each 100HP (5 Nos)
	Ratted Aeration Capacity Kg / KW hr		28200M <sup>3</sup> /hr each
9.	Secondary Settling Tank	:	
	Secondary Settling Tank Volume m <sup>3</sup>		2185 m <sup>3</sup>
	Settling Surface Area m <sup>2</sup>		---
	Retention Period		2.15HRS
	Weir length m		218.65 m
	Retention flow rates m <sup>3</sup> / Hr or m <sup>3</sup> / day		25000 m <sup>3</sup> /day
	Return flow solids (TSS) concentration		8000mg/l
10.	A. Activated Sludge Process	:	
	Waste Sludge generation (Flow rate m <sup>3</sup> / hr multiplied by hr / day)		498M <sup>3</sup> /Day
	Waste Sludge Solids (TSS) concentration mg/l		8000 mg/l
	ASP outlet TSS, BOD		TSS-3000mg/l, BOD-NA
	B. UASB	:	<b>NO</b>



<b>11.</b>	Final Effluent Quantity	<b>:</b>	<b>STP Report</b>
	pH		7.72
	TSS		20 mg/l
	COD		85 mg/l
	BOD		15 mg/l
<b>12.</b>	Sludge Thickener	<b>:</b>	
	Volume m <sup>3</sup>		479 M <sup>3</sup>
	Thickening surface m <sup>3</sup>		-
	Underflow Solids Concentration mg/L		8%
	Actual thickened sludge production Rate (Flow rate)		370 M <sup>3</sup> /Day
<b>13.</b>	Sludge Digesters		
	Digester Volume m <sup>3</sup>		2827 M3 x 2 NOs
	Thickening Sludge		
	BOD mg/L		-----
	COD mg/L		
	Actual digester sludge production rate (Flow rate m <sup>3</sup> / hr multiplied by hr / day)		185 M3/day in 2 digester
<b>14.</b>	Biogas produced, if any and its composition		3000 per digester
<b>15.</b>	Operational status of gas utilization		Flaring
<b>16.</b>	Power generation , if any		No power generation
<b>17.</b>	Point of treated sewage disposal (river / lake / irrigation / land and disposal / pisciculture / aquaculture / any other)		Lake
<b>18.</b>	Bypass arrangement of STPS, if any		Yes
<b>19.</b>	Method of Sludge disposal and status (Satisfactory / Unsatisfactory)		Sludge disposed by using trolley dumped in land provided by JMC
<b>20.</b>	Operation and maintenance of Sewage Treatment Plant (Satisfactory / Unsatisfactory)		Satisfactory
<b>21.</b>	Agency for operation and maintenance of Sewage Treatment Plant		Va Tech Wabag Ltd, Chennai
<b>22.</b>	Operation through Sub Contractor		NO
<b>23.</b>	Power requirement		6970 KW/day
<b>24.</b>	Status of power availability for uninterrupted and continuous running of STP		Electricity board power is utilized.
<b>25.</b>	Standby arrangement for power, if any		NO
<b>26.</b>	Status of skilled / Trained Manpower		Skilled & trained manpower available
<b>27.</b>	Annual expenditure on O & M & STP		72 Lakhs
<b>28.</b>	Consent from SPCB		Under Process
<b>29.</b>	Volume of industrial waste being mixed in sewage , if any		Frequently industrial waste is mixed
<b>30.</b>	Status of maintenance of Log Books		Log book Maintained
<b>31.</b>	Status of Laboratory facility		State of art laboratory available



## STP at Jaisinghpura Khor in Jaipur



Inlet to STP



primary clarifier



Secondary clarifier



view of sludge digester

## **9.4 STP at Jawahar Circle in Jaipur**

### **Observation**

- i. The 1MLD STP is located at Jawahar Circle for treating the nearby domestic effluent. The plant has been operated by the private consultant M/s Pollucon Technologies Ltd. Noida.
- ii. The treatment system consisting of collection, reaction tank-I with media, reaction tank-II with media and tube settler& treated water storage tank.
- iii. At the time of visit no inlet flow to the STP was observed and samples were collected from the holding tank. It was informed only during night and morning hours flow will come to the STP. The operator was unable to explain the technical details of the STP during visit.
- iv. It was informed by the local residents during morning hours lot of foul smell comes from the plant due to improper operation.
- v. The treated water was being used for gardening purpose in the park just adjacent to the plant. Housekeeping was satisfactory
- vi. This plant has no power backup/ DG set to run continuously without any disturbance during power cuts.
- vii. Inlet and outlet samples were collected on 25.06.2015 from STP and the analysis results of the samples are given at Table 2. The outlet values of pH, BOD, COD and TSS are 7.63, 11 mg/L ,34 mg/L and 28 mg/L as against the limits 5.5 -9.0, 30 mg/L, 250 mg/L and 100 mg/L, respectively. All the measured values are within the limits.

### **Suggestions**

- i. The STP should obtain the consent to operate from RSPCB and follow the conditions given in it.
- ii. The STP should be operated properly and take necessary measures to prevent foul smell.
- iii. Chlorination/disinfection may be done for the treated effluent before using for gardening purpose in the park.
- iv. Skilled manpower should be posted for operation of STP.
- v. Flow measuring devices should be installed at inlet and outlet of STP.
- vi. The STP should make proper arrangement for safe disposal of sludge.
- vii. To provide DG set for alternate power supply for continuous running of the plant during power failure.
- viii. To maintain logbooks for O &M of STP including inlet and outlet flow.

### Detailed information of STP Jawahar Circle, Jaipur

1.	Name / Location of STP	: Jawahar Circle, Jaipur For recycling of sewage after treatment for irrigation in garden of Ramniwas Bag
2.	Process of Sewage Treatment	: MBBR-Moving Bed Bio Reactor
3.	Flow sheet of STP (to be attached)	: ----
4.	Designed Capacity / day	: 01MLD
5.	Actual Treatment	: 0.4 to 0.8MLD as per water demand in garden
6.	Raw Sewage Characteristics	: STP report
	pH	6.5
	TSS	288
	COD	490
	BOD	242
	NH <sub>3</sub> -N	35
	Total Nitrogen (TKN)	42
	FC	32x10 <sup>4</sup>
	TC	44x10 <sup>4</sup>
7.	Primary Settling Tank	: Not Applicable
8.	Aeration Tank	: 2 Nos MBBR tank of total capacity 330M <sup>3</sup>
9.	Secondary Settling Tank	: 1 No. tube settler of effective settling area of tubes – 112M <sup>2</sup>
10.	A. Activated Sludge Process	: Not Applicable
	B. UASB	: Not Applicable
11.	Final Effluent Quantity	: STP report
	pH	7.1
	TSS	12
	COD	45
	BOD	8
	NH <sub>3</sub> -N,	8
	Total Nitrogen	12
	TC	190
	FC	135
12.	Sludge Thickener	: Not Applicable
13.	Sludge Digesters	Not Applicable
14.	Biogas produced, if any and its composition	Not Applicable
15.	Operational status of gas utilization	Not Applicable
16.	Power generation , if any	Not Applicable
17.	Point of treated sewage disposal (river / lake / irrigation / land and disposal / pisciculture / aquaculture / any other)	Irrigation
18.	Bypass arrangement of STPS, if any	No

19.	Method of Sludge disposal and status (Satisfactory / Unsatisfactory)	<b>Via filter press Satisfactory</b>
20.	Operation and maintenance of Sewage Treatment Plant (Satisfactory / Unsatisfactory)	<b>Satisfactory</b>
21.	Agency for operation and maintenance of Sewage Treatment Plant	<b>Pollucon Technologies Ltd D-39, Sector-7, Noida</b>
22.	Operation through Sub Contractor , if any	<b>NO</b>
23.	Power requirement	<b>Max. Running power- 50HP Approx. unit consumption 600-700 Units/day and it varies as the water demand of Garden</b>
24.	Status of power availability for uninterrupted and continuous running of STP	<b>Uninterrupted and continuous power is not available</b>
25.	Standby arrangement for power, if any	<b>NA</b>
26.	Status of skilled / Trained Manpower	<b>Trained manpower</b>
27.	Annual expenditure on O & M & STP	<b>Manpower cost of O&amp;M – Rs. 440000/- Power consumption varies from 600-700 Units/day and it varies as the water demand of Garden</b>
28.	Consent from State Pollution Control Board / Pollution Control Committee or Not	<b>Consent from RSPCB-available</b>
29.	Volume of industrial waste being mixed in sewage , if any	<b>NO</b>
30.	Status of maintenance of Log Books	<b>Yes</b>
31.	Status of Laboratory facility	<b>NA</b>

## STP at Jawahar Circle in Jaipur



View of the STP flow diagram



mixed bed bioreactor



Tube settler



Treated water holding tank



## **9.5 STP at Ramnivas Garden in Jaipur**

### **Observation**

- i. The STP at Ramnivas Garden was contracted by RUIDP for supplying of water to park and it is commissioned in the year March 2014. It was informed that the facility has valid consent from RSPCB but copy of the same was not provided.
- ii. The capacity of the plant is 1MLD but at the time of visit about 0.8 MLD flow observed. The treated water used in Ramnivas Garden. As per the plant operator that the plant has been operated with 0.4- 0.8MLD as per the water demand of the garden.
- iii. The STP was constructed by JDA and operated by M/s Pollucon technologies Ltd, Noida. At the time of inspection plant was in operation. Housekeeping was satisfactory.
- iv. It is a Mixing Bed Bio-Reactor (MBBR) technology based STP and the treatment system consisting of collection tank, screen/grit collection tank. Bio-reactor, tube settler, filter press, tertiary treatment (activated carbon filter and sand filter tanks). The plant has one tube settler and two MBBR reactors.
- v. The STP has no DG set for power backup to run the plant continuously.
- vi. Inlet and outlet samples were collected on 24.06.2015 from STP and the analysis results of the samples are given at Table 2. The outlet values of pH, BOD, COD and TSS are 8.1 mg/L, 15 mg/L, 49 mg/L and 49 mg/L as against the 5.5 -9.0, 30 mg/L, 250 mg/L and 100 mg/L, respectively. All the measured values are within the limits.

### **Suggestions**

- i. Flow measuring devices should be installed at inlet and outlet of STP.
- ii. The treated water should be reused after disinfection for gardening purpose.
- iii. The STP should make proper arrangement for safe disposal of sludge.
- iv. To provide DG set for alternate power supply for continuous running of the plant during power failure.
- v. To maintain logbooks for O &M of STP including inlet and outlet flow.

### **Detailed information of STP Ramniwas Garden, Jaipur**

<b>1.</b>	<b>Name / Location of STP</b>	<b>:</b>	<b>Ram Niwas Bag, Jaipur For recycling of sewage after treatment for irrigation in garden of Ramniwas Bag</b>
<b>2.</b>	<b>Process of Sewage Treatment</b>	<b>:</b>	<b>MBBR-Moving Bed Bio Reactor</b>
<b>3.</b>	<b>Flow sheet of STP (to be attached)</b>	<b>:</b>	<b>----</b>
<b>4.</b>	<b>Designed Capacity / day</b>	<b>:</b>	<b>01MLD</b>
<b>5.</b>	<b>Actual Treatment</b>	<b>:</b>	<b>0.4 to 0.8MLD as per water demand in garden</b>
<b>6.</b>	<b>Raw Sewage Characteristics</b>	<b>:</b>	<b>STP report</b>
	pH TSS COD BOD NH <sub>3</sub> -N Total Nitrogen (TKN) FC TC		<b>6.5 288 490 242 35 42 32x10<sup>4</sup> 44x10<sup>4</sup></b>
<b>7.</b>	<b>Primary Settling Tank</b>	<b>:</b>	<b>Not Applicable</b>
<b>8.</b>	<b>Aeration Tank</b>	<b>:</b>	<b>2 Nos MBBR tank of total capacity 330M<sup>3</sup></b>
<b>9.</b>	<b>Secondary Settling Tank</b>	<b>:</b>	<b>1 No. tube settler of effective settling area of tubes – 112M<sup>2</sup></b>
<b>10.</b>	<b>A. Activated Sludge Process</b>	<b>:</b>	<b>Not Applicable</b>
	<b>B. UASB</b>	<b>:</b>	<b>Not Applicable</b>
<b>11.</b>	<b>Final Effluent Quantity</b>	<b>:</b>	<b>STP report</b>
	pH TSS COD BOD NH <sub>3</sub> -N, Total Nitrogen TC FC		<b>7.1 12 45 8 8 12 190 135</b>
<b>12.</b>	<b>Sludge Thickener</b>	<b>:</b>	<b>Not Applicable</b>
<b>13.</b>	<b>Sludge Digesters</b>		<b>Not Applicable</b>
<b>14.</b>	<b>Biogas produced, if any and its composition</b>		<b>Not Applicable</b>
<b>15.</b>	<b>Operational status of gas utilization</b>		<b>Not Applicable</b>
<b>16.</b>	<b>Power generation , if any</b>		<b>Not Applicable</b>
<b>17.</b>	<b>Point of treated sewage disposal (river / lake / irrigation / land and disposal / pisciculture / aquaculture / any other)</b>		<b>Irrigation</b>

18.	Bypass arrangement of STPS, if any	No
19.	Method of Sludge disposal and status (Satisfactory / Unsatisfactory)	Via filter press Satisfactory
20.	Operation and maintenance of Sewage Treatment Plant (Satisfactory / Unsatisfactory)	Satisfactory
21.	Agency for operation and maintenance of Sewage Treatment Plant	Pollucon Technologies Ltd D-39, Sector-7, Noida
22.	Operation through Sub Contractor , if any	NO
23.	Power requirement	Max. Running power- 50HP Approx. unit consumption 600-700 Units/day and it varies as the water demand of Garden
24.	Status of power availability for uninterrupted and continuous running of STP	Uninterrupted and continuous power is not available
25.	Standby arrangement for power, if any	NA
26.	Status of skilled / Trained Manpower	Trained manpower
27.	Annual expenditure on O & M & STP	Manpower cost of O&M – Rs. 440000/- Power consumption varies from 600-700 Units/day and it varies as the water demand of Garden
28.	Consent from State Pollution Control Board / Pollution Control Committee or Not	Consent from RSPCB-available
29.	Volume of industrial waste being mixed in sewage , if any	NO
30.	Status of maintenance of Log Books	Yes
31.	Status of Laboratory facility	NA



## STP at Ramnivas Garden in Jaipur



Inlet to STP



MBBR tank



Tube settler



Activated carbon filter

## **9.6 STP at Vidyadhar Nagar near Swarna Jayanti park in Jaipur**

### **Observation**

- i. The 1MLD STP is located at Vidyadhar Nagar near Swarna Jayanti Park for treating the nearby domestic effluent. The STP was constructed by JDA and operated by the private consultant M/s hydro tub Paryavaran (India) Pvt Ltd, Mohali.
- ii. The STP was commissioned in March 2015 and has valid consent from RSPCB.
- iii. During the visit plant was in operation. It was informed that 6 peoples are engaged for operation of STP in three shifts.
- iv. It is a Mixing Bed Bio-Reactor (MBBR) technology based STP and he treatment system consisting of collection tank, screen/grit collection tank. Bio-reactor, tube settler, filter press, tertiary treatment (activated carbon filter and sand filter tanks).
- v. The treated water has been used in swarnjayati garden without any disinfection. Flow measuring device was installed at inlet of STP and as per the operator the flow will be always less than 1 MLD.
- vi. The STP has no DG set for power backup to run the plant continuously.
- vii. Laboratory facility not provided for checking of STP operating parameters and the samples are being analyzed through PHED laboratory.
- viii. Housekeeping requires improvement. Logbooks maintained for the operation, maintenance and analysis of STP by the operator.
- ix. Inlet and outlet samples were collected from STP on 24.06.2015. The analysis results of the samples are given at Table 2. The outlet values of pH, BOD, COD and TSS are 7.63, 23 mg/L , 76 mg/L and 80 mg/L as against the 5.5 -9.0, 30 mg/L, 250 mg/L and 100 mg/L, respectively. All the measured values are within the limits.

### **Suggestions**

- To obtain/ renew the Consent under Water Act from RSPCB.
- Flow measuring device should be installed at outlet of STP and maintain the record.
- To provide DG set for power backup to run the plant and pump houses continuously.
- STP operator shall ensure periodic analysis of Inlet & Outlet water sample from recognized laboratory or establish own laboratory facility.
- Housekeeping should be improved in the plant.
- As the treated wastewater complying the prescribed discharge norms, option of its utilization shall be practiced.
- The plant should run continuously to avoid foul odour.

### **Detailed information of STP Vidyadhar Nagar, Jaipur**

<b>1.</b>	<b>Name / Location of STP</b>	<b>:</b>	<b>Swarn Jayanti Park, Vidyadhar Nagar, Jaipur</b>
<b>2.</b>	Process of Sewage Treatment	<b>:</b>	<b>MBBR-Moving Bed Bio Reactor</b>
<b>3.</b>	Flow sheet of STP (to be attached)	<b>:</b>	<b>-----</b>
<b>4.</b>	Designed Capacity / day	<b>:</b>	<b>01MLD</b>
<b>5.</b>	Actual Treatment	<b>:</b>	<b>-----</b>
<b>6.</b>	Raw Sewage Characteristics	<b>:</b>	<b>STP report</b>
	pH TSS COD BOD		<b>6.5-8.5</b> <b>250-300mg/l</b> <b>450-500mg/l</b> <b>200-250mg/l</b>
<b>7.</b>	Primary Settling Tank	<b>:</b>	Not Applicable
<b>8.</b>	Aeration Tank	<b>:</b>	Not Applicable
<b>9.</b>	Secondary Settling Tank	<b>:</b>	Not Applicable
<b>10.</b>	A. Activated Sludge Process	<b>:</b>	Not Applicable
	B. UASB	<b>:</b>	Not Applicable
<b>11.</b>	Final Effluent Quantity	<b>:</b>	<b>STP report</b>
	pH TSS COD BOD		<b>6.5-8.5</b> <b>&lt;15mg/l</b> <b>&lt;100mg/l</b> <b>&lt;10mg/l</b>
<b>12.</b>	Sludge Thickener	<b>:</b>	Not Applicable
<b>13.</b>	Sludge Digesters		Not Applicable
<b>14.</b>	Biogas produced, if any and its composition		Not Applicable
<b>15.</b>	Operational status of gas utilization		Not Applicable
<b>16.</b>	Power generation , if any		Not Applicable
<b>17.</b>	Point of treated sewage disposal (river / lake / irrigation / land and disposal / pisciculture / aquaculture / any other)		Horticulture
<b>18.</b>	Bypass arrangement of STPS, if any		<b>No</b>
<b>19.</b>	Method of Sludge disposal and status (Satisfactory / Unsatisfactory)		<b>Satisfactory</b>
<b>20.</b>	Operation and maintenance of Sewage Treatment Plant (Satisfactory / Unsatisfactory)		<b>Satisfactory</b>
<b>21.</b>	Agency for operation and maintenance of Sewage Treatment Plant		<b>Jaipur Development Authority, Jaipur</b>
<b>22.</b>	Operation through Sub Contractor , if any		<b>Hydrotech Paryavaran (India) pvt Ltd, Mohali</b>
<b>23.</b>	Power requirement		<b>At sewage lifting station 13KW</b> <b>At STP 36KW</b>
<b>24.</b>	Status of power availability for uninterrupted and continuous running		<b>Available at STP 60KW</b>

	of STP	
<b>25.</b>	Standby arrangement for power, if any	<b>NO</b>
<b>26.</b>	Status of skilled / Trained Manpower	<b>06 Nos in three shifts</b>
<b>27.</b>	Annual expenditure on O & M & STP	<b>50000/-+ electricity charged (1,00,000/- avg.)</b>
<b>28.</b>	Consent from State Pollution Control Board / Pollution Control Committee or Not	<b>Yes</b>
<b>29.</b>	Volume of industrial waste being mixed in sewage , if any	<b>NO</b>
<b>30.</b>	Status of maintenance of Log Books	<b>Maintained</b>
<b>31.</b>	Status of Laboratory facility	<b>Parameters are being analyzed from outside approved labs.</b>



## **STP Vidyadhar Nagar at Swarna Jayanti Park in Jaipur**



Cemented road in the premises



Treated waste disposed near the STP



Inlet of STP



View of STP structures

## **9.7 STP at Gajodharpura near Kalwad road in Jaipur:**

### **Observation**

- i. The 30MLD STP is located at Gajodharpura near Kalwad road for treating the nearby domestic effluent. The STP was constructed by JDA and commissioned on 27.08.2013.
- ii. Presently the plant has been operated by M/s M S Khurana Engineering Ltd, Ahmadabad. It was informed that 28 peoples are engaged for operation of STP in three shifts.
- iii. Housekeeping was very good in the plant area. About 1500 plantation done in the premises by JDA.
- iv. The sewage has been brought to STP from Sikar Road, Hathoj, Benar etc., through underground pipeline. It was informed that 11 -18 MLD sewages by the plant against designed capacity of 30 MLD.
- v. Flow measuring devices are installed at inlet and outlet of STP. During the visit plant was in operation with inlet flow of 13 MLD.
- vi. It is ASP technology based STP and the treatment system consisting of primary treatment followed by secondary biological treatment. The flow chart is enclosed.
- vii. The treated water has been discharged after disinfection with chlorine in Bundi River which is 1km away from the plant.
- viii. The STP generates methane gas treatment system and flaring has been done for the same gas. During the visit it was informed that due to less gas no proposal has been made for recovery of gas.
- ix. The STP has no DG set for power backup to run the plant continuously. It was informed that JDA is planning to install the DG set within two a month for which shed has already built.
- x. The STP developed separate laboratory facility for checking of STP operating parameters as well as consent parameters i.e BOD, COD, pH, TSS, MLSS etc. The samples are also being analyzed through approved laboratory by the consultant.
- xi. Logbooks are maintained for the operation, maintenance and analysis of STP by the operator.
- xii. The consents under water Act has not been renewed from RSPCB.
- xiii. During the visit Inlet and outlet samples were collected from the STP on 23.06.2015. The detailed analysis results are given at Table 2. The outlet values of pH, BOD, COD and TSS are 8.15, 26 mg/L, 80 mg/L and 89 mg/L as against the prescribed limits 5.5 -9.0, 30 mg/L, 250 mg/L and 100 mg/L, respectively. All the measured values are within the limits.

## **Suggestions**

- i. To connect more areas & collect maximum sewage and operate the STP at maximum capacity by JDA.
- ii. To explore for gas recovery and use for any other purposes instead of flaring in atmosphere.
- iii. To provide DG set for power backup to run the plant continuously.
- iv. To renew the consent under Water Act from RSPCB without further delay.
- v. To reuse the treated water for gardening, construction, industrial cooling etc. after disinfection because all the monitored values are within the limits prescribed by RSPCB.

### Detailed information of STP Gajodharpura, Kalwad road, Jaipur

1.	Name / Location of STP	:	30MLD STP Plant of JDA at Village Gajodharpura, Kalwad road, Jaipur
2.	Process of Sewage Treatment	:	Activated Sludge Process
3.	Flow sheet of STP (to be attached)	:	----
4.	Designed Capacity / day	:	30MLD
5.	Actual Treatment	:	-----
6.	Raw Sewage Characteristics	:	<b>STP Report</b>
	pH TSS COD BOD		7.30 274mg/l 440mg/l 246mg/l
7.	Primary Settling Tank	:	
	Primary Settling Tank Volume $M^3$ Settling Surface Area $M^2$ Weir Length ( m) Retention Period  PST outlet TSS, BOD, COD(mg/l) Under flow Solids concentration mg/l or % Actual Primary Sludge Production rate (Flow rate $M^3$ / hr multiplied by hr / day) Availability of Mechanical Scraper		<b>2x2145M<sup>3</sup></b> <b>2x670 M<sup>2</sup></b> <b>165m</b> <b>2.5HRS</b> <b>TSS-172mg/l, BOD-165mg/l, COD-360mg/l</b> ---- ----- <b>Yes</b>
8.	Aeration Tank	:	
	Aeration Tank Volume $M^3$ Retention period Mixed Liquor MLSS & MLVSS mg / l Aeration Capacity KW or HP Ratted Aeration Capacity Kg / KW hr		2x3865 m <sup>3</sup> 5Hrs 3000 & 2400mg/l ---- ----
9.	Secondary Settling Tank	:	
	Secondary Settling Tank Volume m <sup>3</sup> Settling Surface Area m <sup>2</sup> Retention Period Weir length m Retention flow rates m <sup>3</sup> /Hr or m <sup>3</sup> / day Return flow solids (TSS) concentration		2x2557 m <sup>3</sup> 2x730.25 3.5HRS 95.77 m 18256 m <sup>3</sup> /day -----
10.	A. Activated Sludge Process	:	Not applicable
	B. UASB	:	Not applicable
11.	Final Effluent Quantity	:	<b>STP Report</b>
	pH TSS COD BOD		7.66 48 mg/l 72 mg/l 16 mg/l



	NH3-N Total Nitrogen	16 mg/l 29 mg/l
<b>12.</b>	Sludge Thickener	:
	Volume m <sup>3</sup> Thickening surface m <sup>3</sup> Underflow Solids Concentration mg/L Actual thickened sludge production Rate (Flow rate, m/hr multiplied by hr / d)	4380 M <sup>3</sup> 397.4 --- 120 M <sup>3</sup> /Day
<b>13.</b>	Sludge Digesters	
	Digester Volume m <sup>3</sup> Thickening Sludge BOD mg/L COD mg/L Actual digester sludge production rate (Flow rate m <sup>3</sup> / hr multiplied by hr /d)	2550M <sup>3</sup> x 2 NOs ----- 75
<b>14.</b>	Biogas produced, if any and its composition	Yes
<b>15.</b>	Operational status of gas utilization	Flaring
<b>16.</b>	Power generation , if any	----
<b>17.</b>	Point of treated sewage disposal	Dry river (Bandi river)
<b>18.</b>	Bypass arrangement of STPS, if any	Yes
<b>19.</b>	Method of Sludge disposal and status (Satisfactory / Unsatisfactory)	Satisfactory
<b>20.</b>	Operation and maintenance of Sewage Treatment Plant	Satisfactory
<b>21.</b>	Agency for operation and maintenance of Sewage Treatment Plant	M S Khurana Engineering Ltd, Ahmadabad
<b>22.</b>	Operation through Sub Contractor , if any	NO
<b>23.</b>	Power requirement	600KW
<b>24.</b>	Status of power availability for uninterrupted continuous running of STP	Separate line for continuous supply
<b>25.</b>	Standby arrangement for power, if any	No arrangement
<b>26.</b>	Status of skilled / Trained Manpower	Manager-01, Environment Engineer - 01, Operator-04, Sweeper-03 Chemist-02, Gardener-02 Electric Engineer-03, Helper-07, Watchman-03
<b>27.</b>	Annual expenditure on O & M & STP	63.89 Lakhs
<b>28.</b>	Consent from State Pollution Control Board / PCC or Not	Yes
<b>29.</b>	Volume of industrial waste being mixed in sewage , if any	No
<b>30.</b>	Status of maintenance of Log Books	Yes
<b>31.</b>	Status of Laboratory facility	Yes

## **STP at Gajodharpura in Jaipur**



**Mechanical screen**



**view of STP**



**Final outlet**



**Laboratory**

## **10. STP at Sawai Madhopur in Rajasthan**

### **10.1 STP at Sawai Madhopur**

#### **Observation**

- The 10MLD capacity STP (waste stabilization ponds) was in operation in Sawai Madhopur for treating the domestic effluent. The STP was constructed by the local body of Sawai Madhopur and commissioned in 2014. The treatment system consisting of primary treatment, anaerobic followed facultative ponds. 2014.
- Presently the plant has been operated by M/s Ketu Construction Ltd, Indore. It was observed that 4 peoples are engaged for operation & maintenance of STP.
- Due to inadequate sewer network in the town only 2MLD raw sewage has been collected against the designed capacity of 10 MLD.
- Flow measuring devices are not installed at inlet and outlet of STP. The treated water has been discharged in to local drain without any disinfection.
- The STP has no DG set for power backup to run the plant continuously.
- The STP has not obtained consent under water Act from RSPCB.
- Laboratory facility has been developed for checking of STP inlet & outlet samples etc. Logbooks maintained for the operation, maintenance and analysis of STP by the operator.
- Inlet sample was collected on 25.06.2015 from the STP because there was no overflow from the outlet tank and the analysis results are given at Table 2. The inlet samples values found to be pH-7.63, BOD-11 mg/L, COD-34 mg/L and TSS-28 mg/L as against the prescribed limits of pH-5.5 -9.0, BOD-30 mg/L, COD-250 mg/L and TSS-100 mg/L, respectively.

#### **Suggestions**

- i. The STP should be operated with optimum load by collecting the adequate quantity of wastewater.
- ii. Disinfection/ chlorination may be done for the treated effluent before discharging in to any water body etc.
- iii. To provide DG set for power backup to run the plant & pump house continuously during power cuts.
- iv. Flow measuring devices should be installed at inlet and outlet of STP.
- v. To engage skilled & adequate manpower and give training to the operators etc.
- vi. To obtain the consent under water Act from RSPCB without further delay.

### **Detailed information of STP Surwal, SawaiMadhopur**

1.	Name / Location of STP	: 10MLD STP at Surwal, Sawai Madhopur
2.	Process of Sewage Treatment	: Waste Stabilization Pond
3.	Flow sheet of STP (to be attached)	: ----
4.	Designed Capacity / day	: 10 MLD
5.	Actual Treatment	: 2.5 MLD
6.	Raw Sewage Characteristics	: STP report
	pH COD BOD TSS	7.48 32.8mg/l 124mg/l 244mg/l
7.	Primary Settling Tank	: Not Applicable
8.	Aeration Tank	: Not Applicable
9.	Secondary Settling Tank	: Not Applicable
10.	A. Activated Sludge Process	: Not Applicable
	B. UASB	: Not Applicable
11.	Final Effluent Quantity	: Analysis report not provided
12.	Sludge Thickener	: Not Applicable
13.	Sludge Digesters	Not Applicable
14.	Biogas produced, if any and its composition	Not Applicable
15.	Operational status of gas utilization	Not Applicable
16.	Power generation , if any	Not Applicable
17.	Point of treated sewage disposal	Nearest Bai ka Nallah at Surwal
18.	Bypass arrangement of STPS, if any	Yes
19.	Method of Sludge disposal and status (Satisfactory / Unsatisfactory)	Sludge shall be disposed in Nagar Parishad specified area
20.	Operation and maintenance of STP	Satisfactory
21.	Agency for operation and maintenance of Sewage Treatment Plant	M/s Ketu Construction (I) Ltd 15/3 Vidya Deep, Manormaganj, Indore (MP)
22.	Operation through Sub Contractor	NO
23.	Power requirement	75KW
24.	Status of power availability for uninterrupted and continuous running of STP	Uninterrupted electricity supply by JVVNL
25.	Standby arrangement for power, if any	Yes (82.5KVA DG set)
26.	Status of skilled / Trained Manpower	Skilled & Trained manpower available
27.	Annual expenditure on O & M & STP	Tentative 9 lakhs per annum
28.	Consent from SPCB	Yes
29.	Volume of industrial waste being mixed in sewage , if any	Nil
30.	Status of maintenance of Log Books	Logbook maintain
31.	Status of Laboratory facility	Laboratory available

## **STP at Sawai Madhopur in Rajasthan**



**Inlet of STP**



**Grit chamber**

**View of WSP**



**Laboratory**



## **11. STPs at Jodhpur**

### **11.1 STP at Salawas, Jodhpur**

#### **Observation**

- i. Activated Sludge Process based 50 MLD STP phase-I situated at Salawas village, Jodhpur in 60 hectare area commissioned by M/s UEM India Pvt. Limited, Noida in September 2011.
- ii. Unit has applied to RSPCB for Consent to Operate in March, 2013, however CTO not yet granted.
- iii. For continuous O&M and financial & administrative management an agreement among three parties viz. Rajasthan State government, Jodhpur Municipal Corporation and STP plant operator M/s UEM India Pvt. Limited, Noida.
- iv. Sewage collected through city drains comes to STP & after ASP based treatment like i.e. grit removal chamber, primary clarifier, aeration process, secondary clarifier and sludge thickener process got discharged to final drain. The treated sewer partly used in agriculture and horticultural activities in plant premises.
- v. Flow meter installed at inlet found working & plant was operating satisfactorily and final discharge was meeting the prescribed norms of discharge.
- vi. Unit has well equipped laboratory to analyze sewage for necessary parameters.
- vii. Unit has installed 450 KVA DG set for emergency power supply.
- viii. Commissioning of new 50 MLD plant is under progress.

#### **Suggestion**

- i. To collect & store waste polythene, pouches, papers and other solid waste at proper place and dispose it properly.
- ii. To install flow meter at outlet drain to quantify the waste discharge.
- iii. To made the internal roads Pucca.



### Detailed information of STP Salawas, Jodhpur

<b>1.</b>	<b>Name / Location of STP</b>	<b>:</b>	<b>Sewage Treatment Plant Salawas, Jodhpur (Rajasthan)</b>
<b>2.</b>	Process of Sewage Treatment	<b>:</b>	Activated Sludge Process
<b>3.</b>	Flow sheet of STP (to be attached)	<b>:</b>	----
<b>4.</b>	Designed Capacity / day	<b>:</b>	50 MLD
<b>5.</b>	Actual Treatment	<b>:</b>	35-40 MLD
<b>6.</b>	Raw Sewage Characteristics	<b>:</b>	<b>CPCB Report</b>
	pH TSS COD BOD NH <sub>3</sub> -N Total Nitrogen Fecal Coli form Total Coli form		7.69 336 mg/l 428 mg/l 200 mg/l 3.57 mg/l 19.04 mg/l 2000 1000
<b>7.</b>	Primary Settling Tank	<b>:</b>	
	Primary Settling Tank Volume M <sup>3</sup> Settling Surface Area M <sup>2</sup> Weir Length ( m) Retention Period PST outlet TSS, BOD, COD (mg/l) Under flow Solids concentration mg/l or % Actual Primary Sludge Production rate Availability of Mechanical Scraper		2358.51 M3 1126.4 M2 202.74 M 1 Hr 46 Min TSS 212 mg/l, BOD 103 mg/l, COD 190 mg/l respectively  254 M3/Day 2 Nos
<b>8.</b>	Aeration Tank	<b>:</b>	
	Aeration Tank Volume M <sup>3</sup> Retention period Mixed Liquor MLSS & MLVSS mg / l Aeration Capacity KW or HP Rated Aeration Capacity Kg / KW hr		10081 M3 4:30 Hr 3540 mg/l & 2194 mg/l 2641 Nm <sup>3</sup> /hr (Each blower) 12254.34 M3
<b>9.</b>	Secondary Settling Tank	<b>:</b>	
	Secondary Settling Tank Volume m <sup>3</sup> Settling Surface Area m <sup>2</sup>		02 Nos , 3492.46 M3 (Each tank) 1152 M2
<b>10.</b>	A. Activated Sludge Process	<b>:</b>	
	Waste Sludge generation (Flow rate m <sup>3</sup> / hr multiplied by hr / day) Waste Sludge Solids (TSS) concentration mg/l ASP outlet TSS, BOD		357 M3/Day  4567 mg/l
	B. UASB	<b>:</b>	<b>NO</b>
<b>11.</b>	Final Effluent Quantity	<b>:</b>	<b>CPCB Report</b>
	pH TSS		6.82 10 mg/l

	COD BOD NH <sub>3</sub> -N Total Nitrogen Fecal Coli form Total Coli form	62 mg/l 17 mg/l 0.34 mg/l 2.8 mg/l 10 5.0
<b>12.</b>	Sludge Thickener	:
	Volume m <sup>3</sup> Thickening surface m <sup>3</sup> Underflow Solids Concentration mg/L Actual thickened sludge production Rate (Flow rate)	864.1 M3 220.76 M3 - 295 M3/Day
<b>13.</b>	Sludge Digesters	
	Digester Volume m <sup>3</sup> Thickening Sludge BOD mg/L COD mg/L Actual digester sludge production rate	6601 M3  20000-25000 mg/l 140000-190000 mg/l 194.34 M3/hr.
<b>14.</b>	Biogas produced, if any and its composition	400-500 M3
<b>15.</b>	Operational status of gas utilization	Gas burn through flare tower
<b>16.</b>	Power generation , if any	No
<b>17.</b>	Point of treated sewage disposal (river / lake / irrigation / land and disposal / pisciculture / aquaculture / any other)	Treated sewage are discharge through drain from premises, auction and using by the farmers for agriculture purposes.
<b>18.</b>	Bypass arrangement of STPS, if any	Yes but not in used
<b>19.</b>	Method of Sludge disposal and status (Satisfactory / Unsatisfactory)	Satisfactory, sludge are disposed on Keru Solid Waste Plant
<b>20.</b>	Operation and maintenance of STP	Satisfactory
<b>21.</b>	Agency for operation and maintenance of Sewage Treatment Plant	Nagar Nigam, Jodhpur
<b>22.</b>	Operation through Sub Contractor	M/s UEM India Pvt. Limited, Noida
<b>23.</b>	Power requirement	450 KV
<b>24.</b>	Status of power availability for uninterrupted and continuous running of STP	DG Set
<b>25.</b>	Standby arrangement for power, if any	DG Set
<b>26.</b>	Status of skilled / Trained Manpower	22 persons including operation maintenance and laboratory chemist
<b>27.</b>	Annual expenditure on O & M & STP	4.32 Cr
<b>28.</b>	Consent from SPCB	Applied but not obtained
<b>29.</b>	Volume of industrial waste being mixed in sewage , if any	5-8 MLD
<b>30.</b>	Status of maintenance of Log Books	Maintained
<b>31.</b>	Status of Laboratory facility	Satisfactory



## **50 MLD Sewage Treatment Plant, Salawas (Jodhpur)**



**Inlet Chamber**



**Grit Removal Chamber**



**Flow Meter**

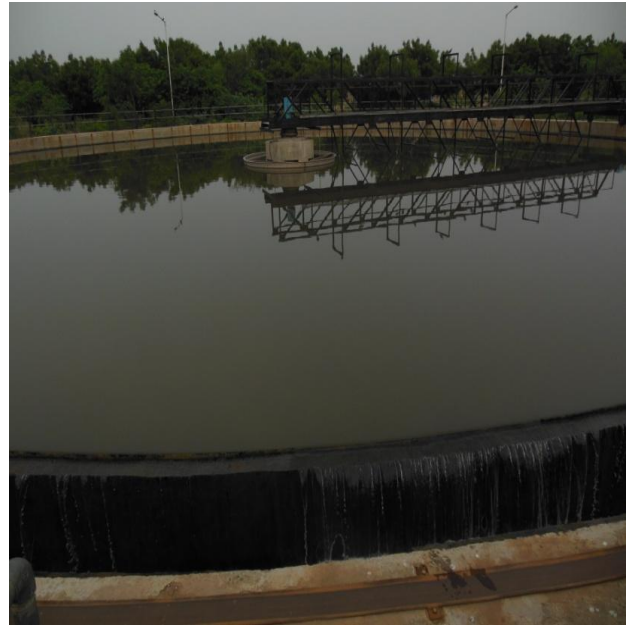


**View of primary Clarifier**

## **50 MLD Sewage Treatment Plant, Salawas (Jodhpur)**



**Aeration Tank**



**Secondary Clarifier**



**Sludge Thickener**



**Treated Water**



## **50 MLD Sewage Treatment Plant, Salawas (Jodhpur)**



Sample Testing Laboratory



Green Belt within the Premises



Construction of New 50 MLD Plant

## **11.2 STP at Nandri, Jodhpur**

### **Observation**

1. Waste Stabilization pond treatment technology based 20 MLD STP commissioned at Nandri village to treat the sewage. The actual operational capacity is 15-18MLD against the designed 20MLD capacity.
2. Unit has not yet obtained the Consent to Operate from RSPCB.
3. Unit has engaged M/s Steel Engineers Ltd, Delhi for regular maintenance of plant. The O&M of plant look after through Nagar Nigam, Jodhpur.
4. Sewage collected through city drains comes to STP & after Waste Stabilization Pond treatment which consist 03 Anaerobic ponds of 1days retention time & 02 facultative ponds of 5days retention time; stored in large pond to sell the treated effluent to farmers for agriculture.
5. Flow meter installed at inlet found working & plant was operating satisfactorily and final discharge was meeting the prescribed norms of discharge.
6. Unit has basic laboratory facility to analyze sewage for necessary parameters.
7. Unit has installed 8KVA DG set with acoustic enclosures for emergency power supply.

### **Suggestion**

1. To collect & store waste polythene, pouches, papers and other solid waste at proper place and dispose it properly.
2. To install flow meter at outlet drain to quantify the waste discharge.
3. To commission additional large storage tank to store the sewer during maintenance.

### **Detailed information of STP Nandri, Jodhpur**

<b>1.</b>	<b>Name / Location of STP</b>	<b>:</b>	<b>20 MLD STP Nandri, Jodhpur</b>
<b>2.</b>	Process of Sewage Treatment	<b>:</b>	<b>WASTE STABILIZATION PONDS</b>
<b>3.</b>	Flow sheet of STP (to be attached)	<b>:</b>	<b>-----</b>
<b>4.</b>	Designed Capacity / day	<b>:</b>	<b>20 MLD</b>
<b>5.</b>	Actual Treatment	<b>:</b>	<b>15-18 MLD (AVG)</b>
<b>6.</b>	Raw Sewage Characteristics	<b>:</b>	<b>CPCB Report</b>
	pH		7.32
	TSS		460 mg/l
	COD		972 mg/l
	BOD		636 mg/l
	NH <sub>3</sub> -N		5.38 mg/l
	Total Nitrogen		64.96 mg/l
	Fecal Coli form		TNTC
	Total Coli form		TNTC
	<b>Anaerobic pond</b>		<b>3 nos, 92m x 51m x 6m</b> <b>Retention period: 1 day</b>
	<b>Facultative pond</b>		<b>2 nos, 350m x 150m x 3m</b> <b>Retention period: 5 days</b>
<b>7.</b>	Primary Settling Tank	<b>:</b>	<b>Not Applicable</b>
<b>8.</b>	Aeration Tank	<b>:</b>	<b>Not Applicable</b>
<b>9.</b>	Secondary Settling Tank	<b>:</b>	<b>Not Applicable</b>
<b>10.</b>	A. Activated Sludge Process	<b>:</b>	<b>Not Applicable</b>
	B. UASB	<b>:</b>	<b>Not Applicable</b>
<b>11.</b>	Final Effluent Quantity	<b>:</b>	<b>CPCB Report</b>
	pH		6.68
	TSS		34 mg/l
	COD		59 mg/l
	BOD		16 mg/l
	NH <sub>3</sub> -N		0.34 mg/l
	Total Nitrogen		3.36 mg/l
	Fecal Coli form		1000
	Total Coli form		500
<b>12.</b>	Sludge Thickener	<b>:</b>	<b>Not Applicable</b>
<b>13.</b>	Sludge Digesters		<b>Not Applicable</b>
<b>14.</b>	Biogas produced, if any and its composition		<b>Not Applicable</b>
<b>15.</b>	Operational status of gas utilization		<b>Not Applicable</b>
<b>16.</b>	Power generation , if any		<b>Not Applicable</b>
<b>17.</b>	Point of treated sewage disposal (river / lake / irrigation / land and disposal / pisciculture / aquaculture / any other)		<b>Auction for agriculture purposes</b>
<b>18.</b>	Bypass arrangement of STPS, if any		<b>By pass Channel</b>
<b>19.</b>	Method of Sludge disposal and status (Satisfactory / Unsatisfactory)		<b>Auction and use for agriculture purposes</b>
<b>20.</b>	Operation and maintenance of Sewage		<b>Satisfactory</b>

	Treatment Plant	
<b>21.</b>	Agency for operation and maintenance of Sewage Treatment Plant	Nagar Nigam, Jodhpur
<b>22.</b>	Operation through Sub Contractor , if any	M/s Steel Engineers Ltd, Delhi
<b>23.</b>	Power requirement	8 KVA
<b>24.</b>	Status of power availability for uninterrupted and continuous running of STP	Power supply from state electricity board
<b>25.</b>	Standby arrangement for power, if any	No
<b>26.</b>	Status of skilled / Trained Manpower	5 Nos Trained manpower
<b>27.</b>	Annual expenditure on O & M & STP	17.4 LACS
<b>28.</b>	Consent from State Pollution Control Board / Pollution Control Committee or Not	Applied but not obtained
<b>29.</b>	Volume of industrial waste being mixed in sewage , if any	No
<b>30.</b>	Status of maintenance of Log Books	log book was maintained
<b>31.</b>	Status of Laboratory facility	Satisfactory

## **20 MLD STP- Nandri, Jodhpur**



**Main Gate**



**Inlet**



**Grit Chamber**



**Aeration Tank**



## **20 MLD STP at Nandri, Jodhpur**



**Inlet Pond**



**Outlet Pond**



## **12.0 STP of Bhilwara**

### **12.1 STP at village Kewara, Bhilwara (Rajasthan)**

#### **Observation**

1. Sequential Batch Reactor (SBR) technology based 10MLD (4.5+5.5MLD) capacity STP at village Kewara, Bhilwara was constructed & commissioned in 2012 by M/s Jindal Saw Ltd. O&M of the plant is being done by M/s UEM India Pvt. Limited, Noida.
2. Unit has obtained Consent to Operate for 5.5MLD against the designed capacity of 10 MLD. The Consent under water Act issued by RSPCB was expired on 31.07.2015 and the unit has applied for renewal of the same. The consent to operate for 4.5MLD is under process and yet to obtain the same from RSPCB.
3. Sewage collected through city drains comes to STP & got treated in sequentially in batch processes of collection, aeration, settling & decanting. The treated sewage is used by M/s Jindal Saw Ltd.
4. Flow meter installed at inlet found working & plant was operating satisfactorily and final discharge was meeting the prescribed norms.
5. The unit has developed laboratory facility to analyze day to day operating parameters of sewage treatment plant and consent parameters but prescribed analysis method has not been followed during analysis.
6. The unit has installed 200 KVA DG set for emergency power supply during state government power shutdown.

#### **Suggestion**

1. To collect & store waste polythene, pouches, papers and other solid waste at proper place and dispose it properly.
2. To install flow meter at outlet drain to quantify the waste discharge.
3. Prescribed procedure should be followed for analysis of environmental parameters.
4. To obtain the renewal of consent without further delay from RSPCB.
5. To collect and treat the maximum quantity of waste water to utilize the designed capacity of STP.
6. The sludge generation and disposal record should be maintained.

### Detailed information of STP Bhilwara

<b>1.</b>	<b>Name / Location of STP</b>	<b>:</b>	<b>(5.5+4.5) 10 MLD STP Unit, Khasra No. 338, Village Kewara Tehsil &amp; Distt- Bhilwara Pin - 311001</b>
<b>2.</b>	<b>Process of Sewage Treatment</b>	<b>:</b>	
	(i) ASP – Activated Sludge process (ii) TP – Trickling Filter (iii) AL – Aerated Lagoon (iv) UASB – Up flow anaerobic sludge blanket (v) OP – Oxidation Pond / waste stabilization ponds (vi) EA – Extended Aeration (vii) SBR – Sequential Batch Reactor (viii) MBR – Membrane Bio Reactor (ix) MBBR – Moving Bed Bio Reactor		<b>SBR-Sequential Batch Reactor</b>
<b>3.</b>	<b>Flow sheet of STP (to be attached)</b>	<b>:</b>	<b>----</b>
<b>4.</b>	<b>Designed Capacity / day</b>	<b>:</b>	<b>(5.5 + 4.5 ) 10 MLD</b>
<b>5.</b>	<b>Actual Treatment</b>	<b>:</b>	<b>5-7.5 MLD</b>
<b>6.</b>	<b>Raw Sewage Characteristics</b>	<b>:</b>	
	pH TSS COD BOD NH <sub>3</sub> -N Total Nitrogen (TKN)		<b>7.30 176 185 30.66 8.59 10.08</b>
<b>7.</b>	<b>Primary Settling Tank</b>	<b>:</b>	<b>Not Applicable</b>
<b>8.</b>	<b>Aeration Tank</b>	<b>:</b>	<b>SBR Technology</b>
	(i) Aeration Tank Volume M <sup>3</sup> (ii) Retention period (iii) Mixed Liquor MLSS & MLVSS mg / L (iv) Aeration Capacity KW or HP (v) Ratted Aeration Capacity Kg / KW hr		<b>5760 M3 (04 Nos.) 13.5 Hours 3600 mg/l  200 HP 10.61 Kg/Kw/Hr.</b>
<b>9.</b>	<b>Secondary Settling Tank</b>	<b>:</b>	<b>Not Applicable</b>
<b>10.</b>	<b>A. Activated Sludge Process</b>	<b>:</b>	
	(i) Waste Sludge generation (Flow rate m <sup>3</sup> / hr multiplied by hr / day)		<b>2-5 M3/Hr as per weather Condition</b>
	<b>B. UASB</b>	<b>:</b>	<b>Not Applicable</b>
<b>11.</b>	<b>Final Effluent Quantity</b>	<b>:</b>	

	pH TSS COD BOD NH <sub>3</sub> -N, Total Nitrogen		<b>7.25</b> <b>68</b> <b>28</b> <b>1.94</b> <b>1.44</b> <b>5.04</b>
<b>12.</b>	Sludge Thickener	:	Not Applicable
<b>13.</b>	Sludge Digesters		Not Applicable
<b>14.</b>	Biogas produced, if any and its composition		Not Applicable
<b>15.</b>	Operational status of gas utilization		Not Applicable
<b>16.</b>	Power generation , if any		Not Applicable
<b>17.</b>	Point of treated sewage disposal (river / lake / irrigation / land and disposal / pisciculture / aquaculture / any other)		Not Applicable
<b>18.</b>	Bypass arrangement of STPS, if any		<b>No</b>
<b>19.</b>	Method of Sludge disposal and status (Satisfactory / Unsatisfactory)		<b>Satisfactory</b>
<b>20.</b>	Operation and maintenance of Sewage Treatment Plant (Satisfactory / Unsatisfactory)		<b>Satisfactory</b>
<b>21.</b>	Agency for operation and maintenance of Sewage Treatment Plant		<b>M/s UEM India Pvt. Ltd.</b>
<b>22.</b>	Operation through Sub Contractor , if any		<b>Yes, M/s UEM India Pvt. Ltd.</b>
<b>23.</b>	Power requirement		<b>Yes</b>
<b>24.</b>	Status of power availability for uninterrupted and continuous running of STP		<b>Yes</b>
<b>25.</b>	Standby arrangement for power, if any		<b>Yes</b>
<b>26.</b>	Status of skilled / Trained Manpower		<b>Yes</b>
<b>27.</b>	Annual expenditure on O & M & STP		<b>Rs. 37890720 + CSR BMC</b>
<b>28.</b>	Consent from State Pollution Control Board / Pollution Control Committee or Not		<b>Yes</b>
<b>29.</b>	Volume of industrial waste being mixed in sewage , if any		<b>No</b>
<b>30.</b>	Status of maintenance of Log Books		<b>Yes</b>
<b>31.</b>	Status of Laboratory facility		<b>Yes</b>

## **STP at village Kewara, Bhilwara**



**Raw Water Inlet, Fine Screen**



**Grit removal system**



**Filtration, aeration, and Nitrification and DO monitoring system**



## **STP at village Kewara, Bhilwara**



**Processed Water Decanting**



**Hypo dosing system**



**Treated water Collection Tank**



**Sludge Sump and Centrifuge Unit**



**Finally treated sewer stored & used in Saw manufacturing units**