Wastewater Treatment at SRM University-AP

SRM University–AP has a process in place to treat the wastewater generated on its campus. Three sewage treatment plants (STPs) run continuously, follow a written Standard Operating Procedure (SOP) displayed at the plant, and return the treated water to campus use instead of discharging it. The key facts are:

- **Four STP units** operate continuously: conventional aeration-based plants with tertiary filtration, and a chemical-free Bio pipe STPs.
- **A documented SOP** covers each stage from screening to chlorine disinfection and is displayed at the plant.
- **Treated water is reused** for gardening, lawn maintenance and toilet flushing, which cuts the demand for fresh water.
- **Quality is checked daily and monthly:** daily sampling at the softener outlet, and monthly testing at NABL certified laboratories.

1. Wastewater Treatment Infrastructure

The university treats its sewage on campus in four functioning STP units. These technologies are in use, and the treated water from the conventional plants passes through tertiary filtration and chlorine disinfection before reuse.

Item	Description
Number of STP units	Four (4) functioning STP units operating continuously
Treatment technologies	Conventional biological treatment (aeration based) with tertiary filtration, and a Bio pipe STP (chemical-free biological system)
Tertiary treatment	Pressure Sand Filter, Activated Carbon Filter and Softener Filter, followed by chlorine disinfection
Documented procedure	SOP for STP displayed at the plant (see Figure 2)
Reuse of treated water	Gardening, lawn maintenance and toilet flushing

S. No.	Sewage Treatment Plant	Capacity (KLD)
1	STP - 1	253
2	STP - 2	500
3	BIO STP - 1	200
4	BIO STP - 2	940
	Total	1893

2. Treatment Process

The SOP on display at the plant defines the step-by-step operation of the conventional sewage treatment plant. The process runs in six stages.

Stage 1: Preliminary treatment

- Check the power supply and the sewage inlet connection at the bar screen chamber.
- Verify that the bar screen is properly installed and clean the debris from the chamber.
- Inspect the oil and grease chamber regularly.

Stage 2: Pumping and primary settling

- Confirm that raw sewage pump outlet valves are open and water levels are checked before switching pumps.
- Start the raw sewage pumps and verify outlet pressure. The pump in operation is interchanged every 8 hours.
- Raw water is discharged into the primary settling tank through a static mixer, and the motor gear drive rotation is verified.

Stage 3: Biological treatment (aeration)

- Check blower lubricant oil and rotation before starting the blowers. The blower in operation is interchanged every 8 hours.
- Open the airline valves to the aeration tank, collection tank and sludge holding tank, and verify the air diffusing systems.
- Blower discharge pressure is verified (approximately 0.45 bar).
- Air and water level in the aeration tank are checked, and MLSS (mixed liquor suspended solids) is verified every 8 hours.
- Once proper MLSS is achieved, water is diverted to the tube settler tank. Clarified water overflows by gravity to the clear water tank.

Stage 4: Sludge management

- If sludge develops in the primary settling tank or tube settler tank, sludge transfer pumps re-circulate sludge to the anoxic tank.
- Excess sludge is pumped to the sludge holding tank.
- Tube settler launders are cleaned regularly.

Stage 5: Tertiary treatment (filtration)

- Water level in the clear water tank is verified, and the filter feed pump inlet and outlet valves are checked to be open.
- Filter feed outlet pressure is maintained between 1.5 and 3 bar.
- Pressure Sand Filter (PSF): the multiport valve is operated in back wash position for 15 minutes, then rinse position for 15 minutes.
- The same steps are repeated for the Activated Carbon Filter (ACF) and the Softener. All multiport valves are then returned to filter mode.
- Multiport valves are never operated while the filter feed pump is running.

Stage 6: Disinfection

- The filter feed pump and chlorine dosing pump are switched on for the filtration process.
- Dosing: 10 kg of chlorine mixed with 100 litres of water, with the dosing pump set at 80% (8 litres per hour), to maintain a residual chlorine level of 0.2 ppm.



Figure 1: Softener, Carbon and Sand filters at the STP



Figure 2: SOP for STP displayed at the plant



Figure 3: Aeration tank of the sewage treatment plant



Figure 4: Treatment chamber with overflow weir at the sewage treatment plant



Figure 5: Sludge holding tank at the sewage treatment plant

3. Bio pipe STP

The campus also operates a Bio pipe Sewage Treatment Plant of **200 KLD** capacity at Amaravati, Andhra Pradesh. It is a biological wastewater treatment system that works without chemicals and without mechanical aeration, and it treats domestic and industrial wastewater in a way that is odour-free and sludge-free. The plant is housed in its own shed, and the treatment pipes are stacked in modular racks.

Because the Bio pipe plant needs no aeration blowers and no chemical dosing, it lowers the electricity and chemical use of sewage treatment on campus, and it removes the need to handle and dispose of excess sludge.

No.	Feature	Benefit
1	Chemical-free process	Uses only biological treatment, with no added chemicals
2	Zero sludge generation	Does not produce excess sludge, unlike conventional STPs
3	Odour-free operation	The biological process eliminates foul smells
4	Compact and modular design	Can be installed in small spaces and expanded as needed
5	Energy efficient	Lower power consumption than traditional aeration-based STPs
6	Low maintenance	Requires minimal operator intervention
7	High water recovery	Treated water is safe for reuse in irrigation, flushing and other non-potable uses



Figure 6: Bio pipe STP (200KLD)



Figure 7: Inside Bio STP at the SRM University-AP

4. Monitoring and Quality Assurance

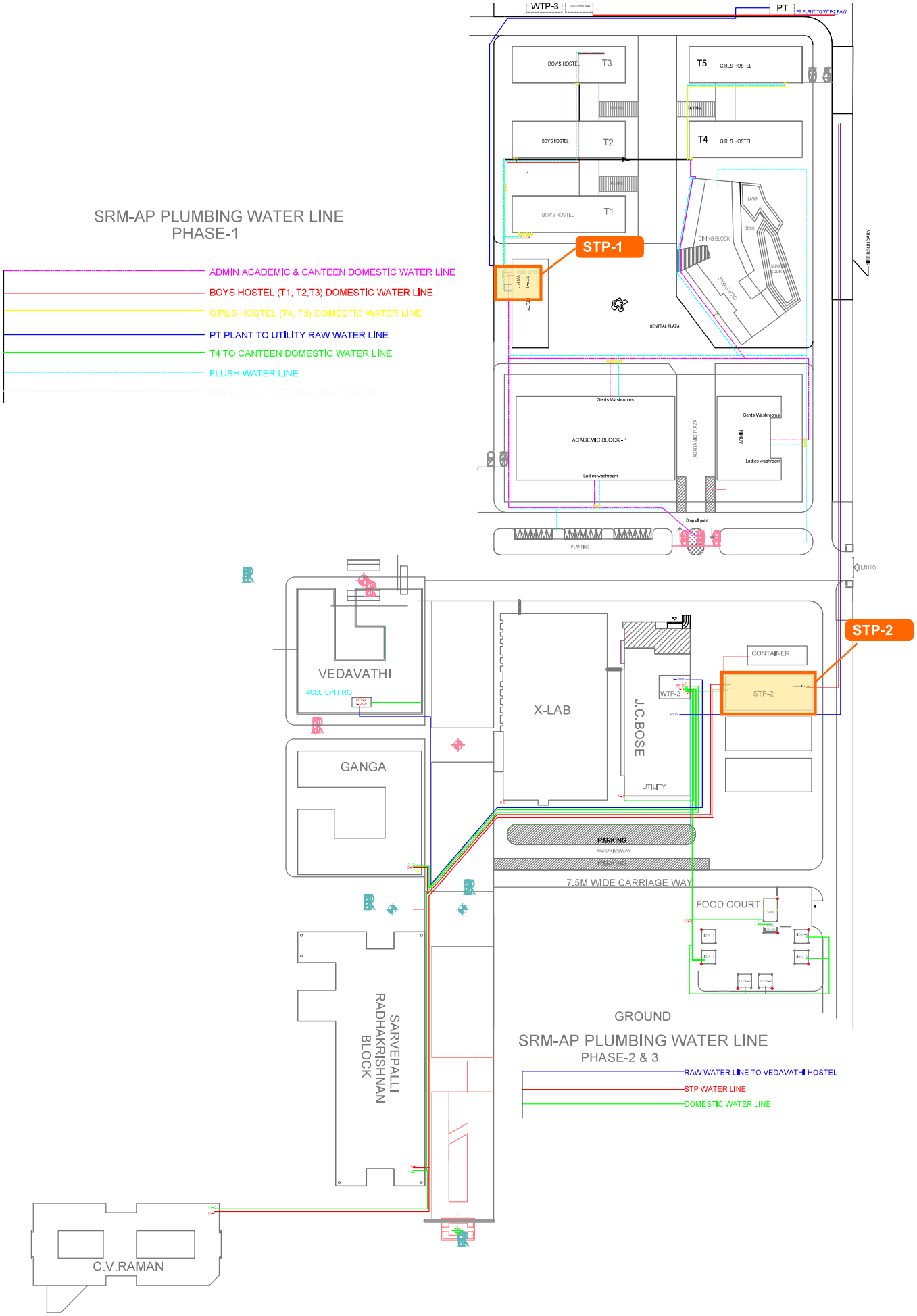
- **Routine checks:** pumps and blowers are interchanged every 8 hours and MLSS is verified every 8 hours.
- **Operating pressures:** verified for blowers and for filter feed lines (1.5 to 3 bar).
- **Daily sampling:** filtered water is sampled at the softener outlet and checked for chlorine, hardness, turbidity, pH and TDS.
- **Monthly external testing:** water samples are sent every month to NABL certified laboratories to check the water parameters.

5. Reuse of Treated Water

After treatment and disinfection, the recycled water is used within the campus for gardening, maintaining lawns and flushing toilets. This closes the water loop on campus, reduces freshwater consumption and avoids the discharge of untreated wastewater, supporting SDG Target 6.3 (improve water quality by reducing pollution and increasing recycling and safe reuse).

SRM UNIVERSITY-AP | CAMPUS STP LOCATION MAP

STP-1 and STP-2 shown within the campus plumbing and water distribution network



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Format No: SLNTL/FF/45A **ULR NO:** TC146522500005219F

TEST REPORT

Report No : SLNTL2500600459	**Report Date :** 13/06/2025
Issued To: M/s. SRM University AP Andhra Pradesh, Neerukonda, Mangalagiri Mandal Guntur District, Andhra Pradesh 522502	**Customer Ref :** WO-ECC25-26/218 WO Date: 27/05/2025
	Date of Sample Collection : 10/06/2025
	Date of Receipt : 10/06/2025
	Date of test start : 10/06/2025
Sample Collected By : Lab Representative	**Date of Completion of test :** 13/06/2025
Sampling Method: SLNTL/QSP/07	**Sample Particulars :** Water
Sample Location: Dormitory Bio STP 200 KLD	**Sample Condition:** Satisfactory
Location of Performance: M/s. SLN Testing Laboratory Pvt. Ltd. Bengaluru – 560058.	
Sample Description: STP Treated Water	

Sl. No	Parameters	Results	Standard	Test Method
Discipline: Chemical				
Group	: Pollution & Environment			
01	Total Suspended Solids, mg/L	33.0	------	IS 3025(Part-17) 2022
02	Biochemical Oxygen Demand (3days @27^{0}C), mg/L	14.0	------	IS 3025(Part-44) 2023
03	Chemical Oxygen Demand, mg/L	80.0	------	IS 3025(Part-58) 2023
04	Total Nitrogen, mg/L	23.0	------	IS 3025(Part-34) 1988
05	Ammonical Nitrogen, mg/L	8.0	------	IS 3025(Part-34) 1988
06	Oil & Grease	<1.0	------	IS 3025 (Part 39) 2021
Discipline: Biological				
Group	: Pollution & Environment			
01	Faecal Coliform, MPN/100ml	<2	------	IS 1622-1981
02	Total Coliform, MPN/100ml	<2	------	IS 1622-1981
03	Escherichia Coli, MPN/100ml	<2	------	IS 1622-1981

**********End of the Report**********

Name: Bangarappa DH
Designation: Senior Microbiologist
Authorized Signatory(Biological)

SLN TESTING LABORATORY PRIVATE LIMITED

Name: Kumara SR
Designation: Quality Manager
Authorized Signatory(Chemical)

Note : 1. The results listed pertain only to the tested samples and applicable parameters.
2. Samples will be destroyed after 15 days from the date of issue of test certificates unless & otherwise specified and all perishable samples will be destroyed immediately after tests conducted.
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Issued To: M/s. SRM University AP Andhra Pradesh, Neerukonda, Mangalagiri Mandal Guntur District, Andhra Pradesh 522502	**Customer Ref :** WO-ECC25-26/218 WO Date: 27/05/2025
	Date of Sample Collection : 10/06/2025
	Date of Receipt : 10/06/2025
	Date of test start : 10/06/2025
Sample Collected By : Lab Representative	**Date of Completion of test :** 13/06/2025
Sampling Method: SLNTL/QSP/07	**Sample Particulars :** Water
Sample Location: STP Final Tank 2	**Sample Condition:** Satisfactory
Location of Performance: M/s. SLN Testing Laboratory Pvt. Ltd. Bengaluru – 560058.	
Sample Description: STP Treated Water	

Sl. No	Parameters	Results	Standard	Test Method
Discipline: Chemical				
Group	: Pollution & Environment			
01	Total Suspended Solids, mg/L	5.0	20 Max	IS 3025(Part-17) 2022
02	Biochemical Oxygen Demand (3days @27^{0}C), mg/L	3.0	10 Max	IS 3025(Part-44) 2023
03	Chemical Oxygen Demand, mg/L	16.0	50 Max	IS 3025(Part-58) 2023
04	Total Nitrogen, mg/L	5.4	10 Max	IS 3025(Part-34) 1988
05	Ammonical Nitrogen, mg/L	1.1	5 Max	IS 3025(Part-34) 1988
06	Oil & Grease	<1.0	10 Max	IS 3025 (Part 39) 2021
Discipline: Biological				
Group	: Pollution & Environment			
01	Faecal Coliform, MPN/100ml	<2	------	IS 1622-1981
02	Total Coliform, MPN/100ml	<2	------	IS 1622-1981
03	Escherichia Coli, MPN/100ml	<2	------	IS 1622-1981

**********End of the Report**********

Name: Bangarappa DH
Designation: Senior Microbiologist
Authorized Signatory(Biological)

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Report No : SLNTL2500901138	**Report Date :** 26/09/2025
Issued To: M/s. SRM University AP Andhra Pradesh, Neerukonda, Mangalagiri Mandal Guntur District, Andhra Pradesh 522502	**Customer Ref :** WO-ECC25-26/496 WO Date: 21/7/2025
	Date of Sample Collection : 23/09/2025
	Date of Receipt : 23/09/2025
	Date of test start : 23/09/2025
Sample Collected By : Lab Representative	**Date of Completion of test :** 26/09/2025
Sampling Method: SLNTL/QSP/07	**Sample Particulars :** Waste Water
Sample Location: Dormitory Bio STP 940 KLD	**Sample Condition:** Satisfactory
Location of Performance: M/s. SLN Testing Laboratory Pvt. Ltd. Bengaluru – 560058.	
Sample Description: STP Treated Water	

Sl. No	Parameters	Results	Standard	Test Method
Discipline: Chemical				
Group	: Pollution & Environment			
01	Total Suspended Solids, mg/L	14.6	------	IS 3025(Part-17) 2022
02	Biochemical Oxygen Demand (3days @27^{0}C), mg/L	5.0	------	IS 3025(Part-44) 2023
03	Chemical Oxygen Demand, mg/L	30.0	------	IS 3025(Part-58) 2023
04	Total Nitrogen, mg/L	7.4	------	IS 3025(Part-34) 1988
05	Ammonical Nitrogen, mg/L	<1.0	------	IS 3025(Part-34) 1988
06	Oil & Grease, mg/L	<1.0	------	IS 3025 (Part 39) 2021
Discipline: Biological				
Group	: Pollution & Environment			
01	Faecal Coliform, MPN/100ml	<2	------	IS 1622-1981
02	Total Coliform, MPN/100ml	<2	------	IS 1622-1981
03	Escherichia Coli, MPN/100ml	<2	------	IS 1622-1981

**********End of the Report**********

Name: Bangarappa DH
Designation: Senior Microbiologist
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Name: Kumara SR
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	Date of Sample Collection : 23/09/2025
	Date of Receipt : 23/09/2025
	Date of test start : 23/09/2025
Sample Collected By : Lab Representative	**Date of Completion of test :** 23/09/2025
Sampling Method: SLNTL/QSP/07	**Sample Particulars :** Waste Water
Sample Location: Dormitory Bio STP 940 KLD	**Sample Condition:** Satisfactory
Location of Performance: M/s. SLN Testing Laboratory Pvt. Ltd. Bengaluru – 560058.	
Sample Description: STP Treated Water	

Sl. No	Parameters	Results	Standard	Test Method
Discipline: Chemical				
Group	: Pollution & Environment			
01	pH Value	7.15	-----	IS 3025 (Part 11) 2022

**********End of the Report**********

Name: Venkatesh GT
Designation: Senior Analyst
Verified By

Name: Kumara SR
Designation: Quality Manager
Authorized Signatory

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