



"Dissemination of Education for Knowledge, Science and Culture."  
- Shikshanmaharshi Dr. Bapuji Salunkhe



## SHRI SWAMI VIVEKANAND SHIKSHAN SANSTHA'S VIVEKANAND COLLEGE, KOLHAPUR (EMPOWERED AUTONOMOUS)

2130, 'E' Ward, Tarabai Park,  
Tal. Karveer, Dist. Kolhapur - 416 003.  
Affiliated to Shivaji University, Kolhapur (M.S.)

NAAC Reaccredited : "A" (CGPA - 3.24 in 3rd Cycle)  
College with Potential Excellence by U.G.C., New Delhi  
"Star College" by D.B.T. Govt. of India  
ISO 9001 : 2015

Ph. : 0231-2658612 Fax : 0231-2658840 Resl. : 0231-2653962 Website : www.vivekanandcollege.ac.in E-mail : info@vivekanandcollege.org

Founder  
Dr. Bapuji Salunkhe  
D.Lit.

President  
Hon. Chandrakant Dada Patil  
Higher and Technical Education Minister, Maharashtra

Chairman  
Prin. Abhaykumar Salunkhe  
M.A.

Secretary  
Prin. Mrs. Shubhangi Gawade  
M.Sc., B.Ed.

Principal  
Dr. R. R. Kumbhar  
M.Sc., M.Phil., Ph.D.

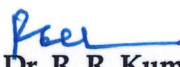
### 7.1 Institutional Values and Social Responsibilities

#### **7.1.4 Water conservation facilities available in the Institution**

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Dr. R. R. Kumbhar  
PRINCIPAL  
VIVEKANAND COLLEGE, KOLHAPUR  
(EMPOWERED AUTONOMOUS)

**Water tank  
cleaning bills  
2023-24**

**Bill for water tanks cleaning at Senior College**

Date: 12 Dec 2023

Invoice No. – TCS/B/2324/205

To,  
The Principal  
**Vivekanand College – Senior College**  
Tarabai Park  
Kolhapur

Date of Cleaning – 10-12-23

Sr. No	Description	Capacity	No	Charges	Amount
				(Rs)	(Rs)
1	Senior College	2000	5	700.00	3500.00
2	Senior College	1000	1	700.00	700.00
				<b>Total</b>	4200.00
				<b>Discount</b>	420.00
				<b>Net Payable</b>	<b>3780.00</b>
<b>In words – Rs. Three Thousand Seven Hundred Eighty Only</b>					
<b>Note –</b> 1. DD/Cheque should be drawn in favour of ' <u>TECHNOCLEAN SERVICES</u> '.					
<b>Bank Details for NEFT / RTGS –</b> Bank – Canara Bank Branch – Dasara Chowk, Kolhapur Account Name – TECHNOCLEAN SERVICES Account Type – Current Account No - 52331010000122 IFSC Code – CNRB0015230					

For **TECHNOCLEAN SERVICES**

Auth. Signatory

**Water tank  
cleaning bills  
2022-23**



**BILL & AGREEMENT FOR ANNUAL MAINTENANCE CONTRACT (AMC) OF  
WATER TANKS CLEANING**

To, The Principal <b>Vivekanand College – Senior College</b> Tarabai Park Kolhapur			Bill No : TCS/B/2324/154									
			Date : 07 June 2023									
			Ref : Telephonic discussions with the Registrar									
Sr. No.	Tank Particulars	Capacity (Litres)	Nos.	Rate	Amount	AMC-2						
1	Senior College	2000	5	700.00	3500.00	6300.00						
2	Senior College	1000	1	700.00	700.00	1260.00						
					<b>Total</b>	<b>7560.00</b>						
<b>Rs. Seven Thousand Five Hundred Sixty Only.</b>												
<b>Note –</b>												
<ol style="list-style-type: none"> <li>1) Above rates are as per the tank capacity details provided by you. In case the capacity changes the rates will change accordingly.</li> <li>2) This Annual Maintenance Contract (AMC) is made for TWO cleanings in a year starting from June 2023. The subsequent cleanings will be done tentatively in the month of Dec 2023.</li> <li>3) The dates can be adjusted as per the convenience of customer and schedule of Technoclean Services. However this AMC should not be extended beyond Feb 2024.</li> <li>4) Electricity &amp; water for cleaning should be provided by the customer free of cost.</li> <li>5) In case of failure of electricity you are requested to arrange for alternate supply like DG set to avoid delay in the work schedule.</li> <li>6) All the tanks to be handed over empty to avoid wastage of water and time.</li> <li>7) Full AMC Payment should be made immediately after first cleaning of the AMC.</li> <li>8) Cheque payable at Kolhapur to be drawn in favour of '<u>TECHNOCLEAN SERVICES</u>'.</li> <li>9) <b>Bank Details for NEFT / RTGS –</b>  <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Bank – Canara Bank</td> <td style="width: 50%;">Branch – Dasara Chowk, Kolhapur</td> </tr> <tr> <td>Account Name – TECHNOCLEAN SERVICES</td> <td>Account Type – Current</td> </tr> <tr> <td>Account No – 52331010000122</td> <td>IFSC Code – CNRB00015230</td> </tr> </table> </li> </ol>							Bank – Canara Bank	Branch – Dasara Chowk, Kolhapur	Account Name – TECHNOCLEAN SERVICES	Account Type – Current	Account No – 52331010000122	IFSC Code – CNRB00015230
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Account Name – TECHNOCLEAN SERVICES	Account Type – Current											
Account No – 52331010000122	IFSC Code – CNRB00015230											

For VIVEKANAND COLLEGE

For Technoclean Services

Authorised Signatory

Authorised Signatory

*"It has been a pleasure to be of service to you and we look forward to a long & healthy association"*

**Bill for water tanks cleaning at Senior College**

Date: 20 June 2023

Invoice No. – TCS/B/2324/112

To,  
The Principal  
**Vivekanand College – Senior College**  
Tarabai Park  
Kolhapur

Date of Cleaning – 18-06-23

Sr. No	Description	Capacity	No	Charges	Amount
				(Rs)	(Rs)
1	Senior College	2000	5	700.00	3500.00
2	Senior College	1000	1	700.00	700.00
				<b>Total</b>	4200.00
				<b>Discount</b>	420.00
				<b>Net Payable</b>	<b>3780.00</b>
<b>In words – Rs. Three Thousand Seven Hundred Eighty Only</b>					
<b>Note –</b> 1. DD/Cheque should be drawn in favour of ' <u>TECHNOCLEAN SERVICES</u> '.					
<b>Bank Details for NEFT / RTGS –</b> Bank – Canara Bank Branch – Dasara Chowk, Kolhapur Account Name – TECHNOCLEAN SERVICES Account Type – Current Account No - 52331010000122 IFSC Code – CNRB0015230					

For TECHNOCLEAN SERVICES

  
Auth. Signatory

**Bill for water tanks cleaning - VCK Senior College**

Date: 19 December 2022

Invoice No. – TCS/B/2223/346

To,  
The Principal  
**Vivekanand College – Senior College**  
Tarabai Park  
Kolhapur

Date of cleaning – 17 Dec 2022

Sr. No	Description	Capacity	No	Charges	Amount
				(Rs)	(Rs)
1	Senior College	2000	5	700.00	3500.00
2	Senior College	1000	1	700.00	700.00
				<b>Total</b>	<b>4200.00</b>
<b>In words – Rs. Four Thousand Two Hundred Only</b>					
<b>Note –</b> 1. DD/Cheque should be drawn in favour of ' <u>TECHNOCLEAN SERVICES</u> '.					
<b>Bank Details for NEFT / RTGS –</b> Bank – Canara Bank Branch – Dasara Chowk, Kolhapur Account Name – TECHNOCLEAN SERVICES Account Type – Current Account No - 52331010000122 IFSC Code – CNRB0015230					

For **TECHNOCLEAN SERVICES****Auth. Signatory**

It has been a pleasure to be of service to you and we look forward to a long & healthy association.

**Water tank  
cleaning bills  
2021-22**





**BILL & AGREEMENT FOR ANNUAL MAINTENANCE CONTRACT (AMC) OF WATER TANKS CLEANING**

<b>To,</b> The Principal <b>Vivekanand College – Senior College</b> Tarabai Park Kolhapur			Bill No : TCS/B/2223/245 Date : 12 June 2022			
			Ref : Telephonic discussions with the Registrar			
Sr. No.	Tank Particulars	Capacity (Litres)	Nos.	Rate	Amount	AMC-2
1	Senior College	2000	5	700.00	3500.00	6300.00
2	Senior College	1000	1	700.00	700.00	1260.00
					<b>Total</b>	<b>7560.00</b>
<b>Rs. Seven Thousand Five Hundred Sixty Only.</b>						
<b>Note –</b> <ol style="list-style-type: none"> <li>Above rates are as per the tank capacity details provided by you. In case the capacity changes the rates will change accordingly.</li> <li>This Annual Maintenance Contract (AMC) is made for TWO cleanings in a year starting from June 2022. The subsequent cleanings will be done tentatively in the month of Dec 2022.</li> <li>The dates can be adjusted as per the convenience of customer and schedule of Technoclean Services. However this AMC should not be extended beyond Feb 2023.</li> <li>Electricity &amp; water for cleaning should be provided by the customer free of cost.</li> <li>In case of failure of electricity you are requested to arrange for alternate supply like DG set to avoid delay in the work schedule.</li> <li>All the tanks to be handed over empty to avoid wastage of water and time.</li> <li>Full AMC Payment should be made immediately after first cleaning of the AMC.</li> <li>Cheque payable at Kolhapur to be drawn in favour of 'TECHNOCLEAN SERVICES'.</li> <li><b>Bank Details for NEFT / RTGS –</b>                      Bank – Canara Bank                      Branch – Dasara Chowk, Kolhapur                      Account Name – TECHNOCLEAN SERVICES                      Account Type – Current                      Account No – 52331010000122                      IFSC Code – CNRB00015230                 </li> </ol>						

For VIVEKANAND COLLEGE

Authorised Signatory

For Technoclean Services

  
Authorised Signatory



**Bill for water tanks cleaning at Senior College**

Date: 27 June 2022

Invoice No. – TCS/B/2223/171

To,  
The Principal  
**Vivekanand College – Senior College**  
Tarabai Park  
Kolhapur

Date of cleaning – 26 June 2022

Sr. No	Description	Capacity	No	Charges	Amount
				(Rs)	(Rs)
1	Senior College	2000	5	700.00	3500.00
2	Senior College	1000	1	700.00	700.00
				<b>Total</b>	<b>4200.00</b>
<b>In words – Rs. Four Thousand Two Hundred Only</b>					
<b>Note –</b> 1. DD/Cheque should be drawn in favour of ' <u>TECHNOCLEAN SERVICES</u> '.					
<b>Bank Details for NEFT / RTGS –</b> Bank – Canara Bank Branch – Dasara Chowk, Kolhapur Account Name – TECHNOCLEAN SERVICES Account Type – Current Account No - 52331010000122 IFSC Code – CNRB0015230					

For **TECHNOCLEAN SERVICES**

Auth. Signatory

It has been a pleasure to be of service to you and we look forward to a long & healthy association.

# **Waste water recycling agreement**

**COMPLETION REPORT  
OF  
200 KLD CAPACITIES  
SEWAGE TREATMENT PLANT**

***For***

**SHREE SWAMI VIVEKANAND SHIKSHAN SANSTHA'S  
VIVEKANAND COLLAGE KOLHAPUR**

2130, E WARD, TARABAI PARK, KOLHAPUR.

MAHARSHTRA 416003.

***By***

**GREENMARK TECHNOLOGIES PVT. LTD.**

B-01-12, Sterling Tower, Gavati Mandai,

Shahupuri, Kolhapur 416001.

DATE-20Jan2022

**To,**  
**SHREE SWAMI VIVEKANAND SHISHAN SANSTA'S**  
VIVEKANAND CALLAGE KOLHAPUR  
2130 E WARD, TARABAI PARK  
KOLHAPUR 416003.

**Subject : Completion Report of 200 KLD Capacities Sewage Treatment Plant.**

Dear Sir,

Ref. to the cited work order of supply, Commissioning, and Eructation of 200 KLD Sewage Treatment Plant. As per your work order we are successfully completed Commissioning and Eructation of the 200 KLD capacity Sewage Treatment Plant.

If any further query and clarification is required regarding the STP so feel free to contact us.

Thanking you in anticipation

Yours Faithfully,  
For

  
  
**GREENMARK TECHNOLOGIES PVT. LTD.**  
KOLHAPUR.

## BASIS OF DESIGN

### 1. QUANTITY

**Design Flow: 200KLD**

**Type of Effluent: Educational Campus Waste Water**

### 2. DESIRED QUALITY OF EXPECTED EFFLUENT

Sewage Treatment Plant to be designed to produce treated effluent having following characteristics.

#### A]

#### **RAW INFLUENT PARAMETER ( At the inlet of Collection/ Septic tank)**

pH	6.0-8.5
COD	650 mg/lit
BOD	250mg/lit
Suspended Solids	100 mg/lit
Oil & Grease	50 mg/lit

#### **TREATED WATER PARAMETER ( After tertiary Filtration System)**

pH	7.5-8.5
COD	Less than 50 mg/lit
BOD	Less than 20mg/lit
Suspended Solids	Less than 20 mg/lit
Oil & Grease	Less than 10 mg/lit

#### B] ASSUMPTIONS

1. The plant is designed to operate at +/- 10 % variation in raw wastewater parameter.
2. other parameters other than mentioned above is present in the raw waste water which is beyond Pollution Control Norms and hazardous to microorganisms.
3. Treated water quality will be achieved if the inlet raw water quality is as per the raw water quality mentioned as well as no other pollutant than the mentioned, is present or exceeds the limits or which is hazardous in nature, which otherwise may affect the biological treatment process.

**MOVING BED BIOFILM REACTOR (MBBR) TECHNOLOGY**

Moving Bed Biofilm Reactor (MBBR) processes improve reliability, simplify operation, and require less space than traditional wastewater treatment systems.

MBBR technology employs thousands of polyethylene biofilm carriers operating in mixed motion within an aerated wastewater treatment basin. Each individual biocarrier increases productivity through providing protected surface area to support the growth of heterotrophic and autotrophic bacteria within its cells. It is this high-density population of bacteria that achieves high-rate biodegradation within the system, while also offering process reliability and ease of operation.

This technology provides cost-effective treatment with minimal maintenance since MBBR processes self-maintain an optimum level of productive biofilm. Additionally, the biofilm attached to the mobile biocarriers within the system automatically responds to load fluctuations.

The MBBR process is ideally suited for carbonaceous biochemical oxygen demand and chemical oxygen demand (BOD/COD) removal applications. MBBR processes retain a large volume of biofilm within the biological wastewater treatment process. As a result, degradation of biodegradable contaminants are sustained in highly compact tank sizes. Without the requirement to return sludge, the process provides increased protection against toxic shock, while automatically adjusting to load fluctuations.

**PROCESS BENEFITS****Compact Design**

A fraction of the size of conventional systems

**Expandable**

Capacity can be easily upgraded by simply increasing the fill fraction of biofilm carriers

**Single Pass Process**

No return activated sludge stream required

**Load Responsive**

Actively sloughed biofilm automatically responds to load fluctuations

**Minimal Maintenance**

No F/M ratios or MLSS levels to maintain

**DESCRIPTION OF TREATMENT SCHEME:**

The STP is designed on continuous basis to treat the various domestic waste generated in the plant the details of which are mentioned in the Above Parameter Table

- Screening, collection, equalization and transfer of wastewater to STP.
- Biological treatment of wastewater in MBBR [Moving Bed Bio-Reactor].
- Secondary Settling through tube settler of biologically treated wastewater.
- Filtration by Pressure Sand and Carbon Filter.
- Dis-infection (by sodium hypo-chloride) of treated water and final disposal
- If treated water is intended for reuse in the Gardening then Tertiary filtration system
- Using separate Sand filter followed by activated carbon filter is provided.
- Sludge generated in the system is drained into the Sludge thickener.

To have eco-friendly & natural treatment, this plant is designed based on the biological treatment concept. This means naturally occurring microbes (which are present in influent water itself) removes or degrade the organic matter present in the influent & at the end clean water is available for the non-potable usage or to dispose safely in the drainage or river bodies as per the norms.

**1. Pre – Treatment**

**Screening:** This is the first units of the plant in which large or floating materials in the influent gets arrested and blockage or choking of the downstream equipment can be avoided. This arrested material will be removed manually and then will be disposed of suitably

**Equalization:**

The Equalization tank equalizes incoming sewage both qualitatively as well as quantitatively and ensures uniform supply of equalized sewage to biological treatment system at constant rate. To absorb variation in quantity and quality of influent and to provide uniform flow at the downstream treatment process, a collection or equalization tank is provided. This will avoid shock loading and process upsets of the treatment plant. To avoid settling of suspended solids in this tank continues air agitation is provided. The contents of the equalization tank will be mixed by means of air agitation in order to avoid the septic conditions and eliminate the odour problem.

If at site, septic tank is provided then collection tank as well as air agitation is not required.

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## 2. Secondary Treatment

### Biological Treatment:

The equalized sewage from the raw sewage collection tank will then be pumped @ 4 m<sup>3</sup>/hr with the help of 2 nos. (1W+1S) pumps to the aeration tank of biological treatment system. Provision for pH correction of effluent before entering aeration tank will be provided.

This is the main section of the plant where degradation of organic pollutants with the help of aerobic microorganisms takes place. In the aeration tank, the dissolved and residual suspended and colloidal organic matter present in incoming sewage will be destroyed aerobically by microbial activity. The oxygen required for microbial activity will be supplied to the contents of the aeration tank by passing compressed air. The compressed air will be diffused into the contents through tubular membrane air diffusers provided at the bottom. As the fine diffused air bubbles being discharged from diffusers travel upward, the oxygen present in the air will be taken up by micro-organisms present in the mixed liquor in the aeration tank which will be utilized by the micro-organisms for its biological activity while destroying the organic matter. The compressed air will be supplied by twin lobe rotary air blowers. Two nos. twin lobe rotary air blowers will be provided near the treatment plant.

The desired level of mixed liquor suspended solids (MLSS) will be maintained in the aeration tank to ensure the presence of the desired level of active bio-mass.

To maintain the aerobic condition in the bioreactor, air supply arrangement is provided by means of aeration equipment which has high oxygen transfer efficiency from collection tank, sewage will be pumped by sewage lift pumps to MBBR for degradation of the organic matters in the form of BOD. MBBR media is acting as a substratum or more surface area for microbes for degradation or decomposition of organic matter.

MBBR works on the attached Suspended Biological growth principle. To maintain the aerobic condition in the reactors, continuous air supply is provided by means of Twin lobe type Air Blowers. The MBBR process is ideally suited for carbonaceous biochemical oxygen demand and chemical oxygen demand (BOD/COD) removal applications. MBBR processes retain a large volume of biofilm within the biological wastewater treatment process.

**Tube Settler:**

Gravity overflow from the bioreactor is collected in the tube settler tank. In this settling tank, generated sludge from the bioreactor undergoes a gravity settling. Clear supernatant from settling tank will flow by gravity to a chlorine contact tank. To reduce the plan area of settling tank, tube modules are placed in this tank to increase the settling area of the tank. Since this tank is a hopper bottom tank due to which there is no need of sludge scrapping mechanisms. Settled sludge from tube settler will be removed by pumping to the sludge holding tank

**Disinfection:**

Supernatant from Tube settler, flow by gravity to the chlorine contact tank. To disinfect the harmful bacteria in the treated water as well as to remove the refractory organics from treated water, in this tank hypo chlorite solution is dosed with the help of dosing system.

**Solid Waste Handling:**

The sludge from secondary and tertiary clarifier will be collected in sludge holding tank and will be pumped to filter press. The recovered water (filtrate) will be sent to equalisation tank and the sludge can be mixed with soil & used as manure.

**3. Tertiary treatment :**

Secondary treated water will be further passed through sand media filter followed by activated carbon filter. From Intermediate tank treated water will be further polished in the Sand media filters followed by activated carbon filter for removal of Colour and Odour. This is called the tertiary treatment. In this process the Sodium hypochlorite is feed online for disinfection or by UV tubes. Filtered water will be collected in the Irrigation water tank from where it will be for desired non potable application. Backwashed water from filters will return back to equalization tank

**4. Recycling :**

Filtered water will be collected in the Final Collection water tank from where it will be pumped to the Gardening or Toilet Flushing.

## ADVANTAGES OF TREATMENT SCHEME

- This plant will produce the treated water which can be recycled back.
- This plant is based on biological principle hence no need use of any excessive hazardous chemicals for the main degradation process.
- Due to efficient aeration system, electrical power requirement is very low.
- Due to user friendly equipment, plant maintenance is very less.
- Due to inbuilt automation, plant machinery life is high & ensures trouble free operation
- All process rotating electromechanical equipment is provided with standby equipment to ensure the uninterrupted operation.
- Due to effective after sales service from our qualified staff, maintenance issues to the owner are less.
- If influent treated & operated properly this effluent treatment plant will give enormous benefits such as
  - It will avoid the water pollution
  - It will help us to give hygienic surrounding
  - After required treatment, treated water can reduce our 60-70 % fresh water requirement, which otherwise we use for toilet flushing, gardening, construction etc. Thus we can save a lot on water expenditure as well as provide us a remedy on present water crises.
  - Being a water recycling & conservation system, commercial establishment gets depreciation benefits for promoting green & ecofriendly development.
  - Filtered water will be collected in the Final Collection water tank from where it will be pumped to the Gardening or Toilet Flushing.

Above all, we will be ensuring safe & hygienic environment to our society.

FLOW SHEET DIAGRAMME OF STP

