7.1 Institutional Values and Social Responsibilities

7.1.4 Water conservation facilities available in the Institution

TABLE OF CONTENTS

WATER QUALITY AND QUANTITY REPORT

1. Water Quality Assessment

Water samples from different locations were collected and analyzed for its quality parameters. The samples includes the main water source of the college campus, water samples which is used for canteen and drinking water cum cooler systems. The samples were collected and analyzed for various physio-chemical parameters in the environment laboratories of civil engineering department. The major parameters analyzed include dissolved oxygen, acidity, alkalinity, chloride, hardness, pH, conductivity, total dissolved solids and salinity. The results are presented in the Table 1. The results are comparable with the values of drinking water standards prescribed by different agencies.

Table 1 Results of tests for water quality

VISWAJYOTHI COLLEGE OF ENGINEERING & TECHNOLOGY
Vazhakulam, Muvattupuzha, Kerala- Pin 686 670.
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CONSULTANCY SERVICES DIVISION

No. 43 Date: 16/01/19

To M.E.S. College Aluva

Ref No. CO-40

Following are the results of the tests conducted on the sample supplied by you on 16/01/19

Sl. No	Parameter	Unit	Methods used	Results obtained	Desirable limit
			Drinking water		
1.	Turbidity	NTU	Turbidity Meter	0.49	5
2.	Taste	—		—	Agreeable
3.	pH	—	pH Meter	7.03	6.5 to 8.5
4.	Total Hardness	mg/l	Titrimetric	34.05	300
5.	Total dissolved solids(TDS)	mg/l	Titrimetric	62.3	500
6.	Salinity	mg/l	Titrimetric	—	<180
7.	Iron	mg/l	Colorimetric	0.0006	0.3
8.	Chloride	mg/l	Titrimetric	31.985	250
9.	Residual Free Chlorine*	mg/l	Colorimetric	—	0.2
10.	Fecal Coliform	MPN/ CFU	MPN/MF method	<2 No/100ml	Must not be detectable
			Waste water		
11.	BOD	mg/l	Incubation/ Titrimetric	\	<20mg/l
12.	COD	mg/l	Titrimetric	\	<200mg/l

Staff in Charge HOD PRINCIPAL

VISWAJYOTHI COLLEGE OF ENGINEERING & TECHNOLOGY

Vazhakulam, Muvattupuzha, Kerala- Pin 686 670
Ph 0485-2262211,2262244

CONSULTANCY SERVICES DIVISION

No. 11 Date: 16/01/19

To.....VJCET.....Nadukkara.....Sarayu.....

Ref No. CJ-61

Following are the results of the tests conducted on the sample supplied by you on 16/01/19

Sl. No	Parameter	Unit	Methods used	Results obtained	Desirable limit
			Drinking water		
1.	Turbidity	NTU	Turbidity Meter	1.1	5
2.	Taste	---		—	Agreeable
3.	pH	--	pH Meter	7.29	6.5 to 8.5
4.	Total Hardness	mg/l	Titrimetric	175	300
5.	Total dissolved solids(TDS)	mg/l	Titrimetric	34.5	500
6.	Salinity	mg/l	Titrimetric	—	<180
7.	Iron	mg/l	Colorimetric	Nil	0.3
8.	Chloride	mg/l	Titrimetric	6.9934	250
9.	Residual Free Chlorine*	mg/l	Colorimetric	—	0.2
10.	Fecal Coliform	MPN/ CFU	MPN/MF method	22 Nos/100ml	Must not be detectable
			Waste water		
11.	BOD	mg/l	Incubation/ Titrimetric		<20mg/l
12.	COD	mg/l	Titrimetric		<200mg/l

Staff in Charge HOD PRINCIPAL

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CONSULTANCY SERVICES DIVISION

No. 41 Date: 27/11/2019

To VJCET, Vazhakulam, Drinking Water Sample

Ref No. CI-38

Following are the results of the tests conducted on the sample supplied by you on 20/11/2019

Sl. No	Parameter	Unit	Methods used	Results obtained	Desirable limit
	Drinking water				
1.	Turbidity	NTU	Turbidity Meter		5
2.	Taste	---			Agreeable
3.	pH	--	pH Meter		6.5 to 8.5
4.	Total Hardness	mg/l	Titrimetric		300
5.	Total dissolved solids(TDS)	mg/l	Titrimetric		500
6.	Salinity	mg/l	Titrimetric		<180
7.	Iron	mg/l	Colorimetric		0.3
8.	Chloride	mg/l	Titrimetric		250
9.	Residual Free Chlorine*	mg/l	Colorimetric		0.2
10.	Fecal Coliform	MPN/ CFU	MPN/MF method	Absent/100ml	Must not be detectable
	Waste water				
11.	BOD	mg/l	Incubation/ Titrimetric		<20mg/l
12.	COD	mg/l	Titrimetric		<200mg/l

Staff in Charge HOD PRINCIPAL

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Vazhakulam, Muvattupuzha, Kerala- Pin 686 670.
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CONSULTANCY SERVICES DIVISION

No. 40 Date: 27/11/19

To. Viswajyothi college of Engineering & Technology, Vazhakulam

Ref No. CO-37

Following are the results of the tests conducted on the sample supplied by you on 20/11/19

Sl. No	Parameter	Unit	Methods used	Results obtained	Desirable limit
	Drinking water				
1.	Turbidity	NTU	Turbidity Meter		5
2.	Taste	---			Agreeable
3.	pH	--	pH Meter		6.5 to 8.5
4.	Total Hardness	mg/l	Titrimetric		300
5.	Total dissolved solids(TDS)	mg/l	Titrimetric		500
6.	Salinity	mg/l	Titrimetric		<180
7.	Iron	mg/l	Colorimetric		0.3
8.	Chloride	mg/l	Titrimetric		250
9.	Residual Free Chlorine*	mg/l	Colorimetric		0.2
10.	Fecal Coliform	MPN/ CFU	MPN/MF method	Less than 3 No./100ml	Must not be detectable
	Waste water				
11.	BOD	mg/l	Incubation/ Titrimetric		<20mg/l
12.	COD	mg/l	Titrimetric		<200mg/l

Staff in Charge HOD PRINCIPAL

2. Water Management

VJCET is located in a water scarcity area due to geographic complexity. In summer days the source of sufficient water is met by pumping water from pond near Thodupuzha river using two submersible pump to a intermediate storage tank and to a natural pond. The pumping distance is approximately 2.5 km. But in monsoon season natural pond existing in the campus is able to provide sufficient water.

From the intermediate storage tank which has a capacity of 3 lakh liter and from natural pond water is again pumping to overhead tank with capacity of 2.5 lakh liter. From this overhead tank water is distributed to sub tanks placed over every buildings. Every sub tank has sensor based solenoidvalvemechanicalsysteminordertoavoidtheoverflowandthetankneverbeemptied.

Drain water is collected from different buildings and pumping to sewage treatment plant in the campus and treated and is used for the gardening of the entire campus.

Table 2 Monthly pumping quantity of water, 2018

Month	kL
JANUARY	6550
FEBRUARY	5540
MARCH	7450
APRIL	7160
MAY	7730
JUNE	7560
JULY	7710
AUGUST	7850
SEPTEMBER	7520
OCTOBER	7500
NOVEMBER	7600
DECEMBER	7740

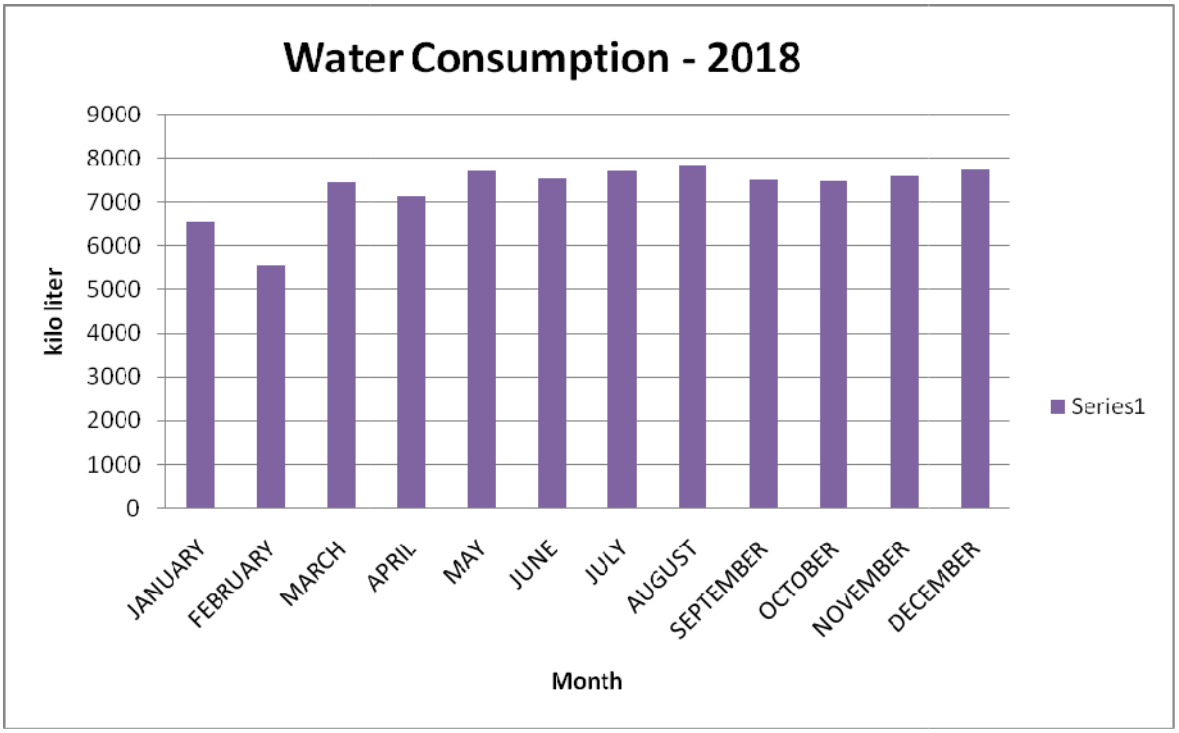

Fig 2 Bar chart of monthly pumping quantity of water , 2018

Table 3 Average Category Wise Water Consumption

Category Wise Water Consumption	
USAGE /Place	Consumption (kL/day)
GARDENING	36.8
HOSTEL BOYS	57.5
HOSTEL GIRLS	59.8
CANTEEN	11.5
COLLEGE TOILETS	46
STP	18.4

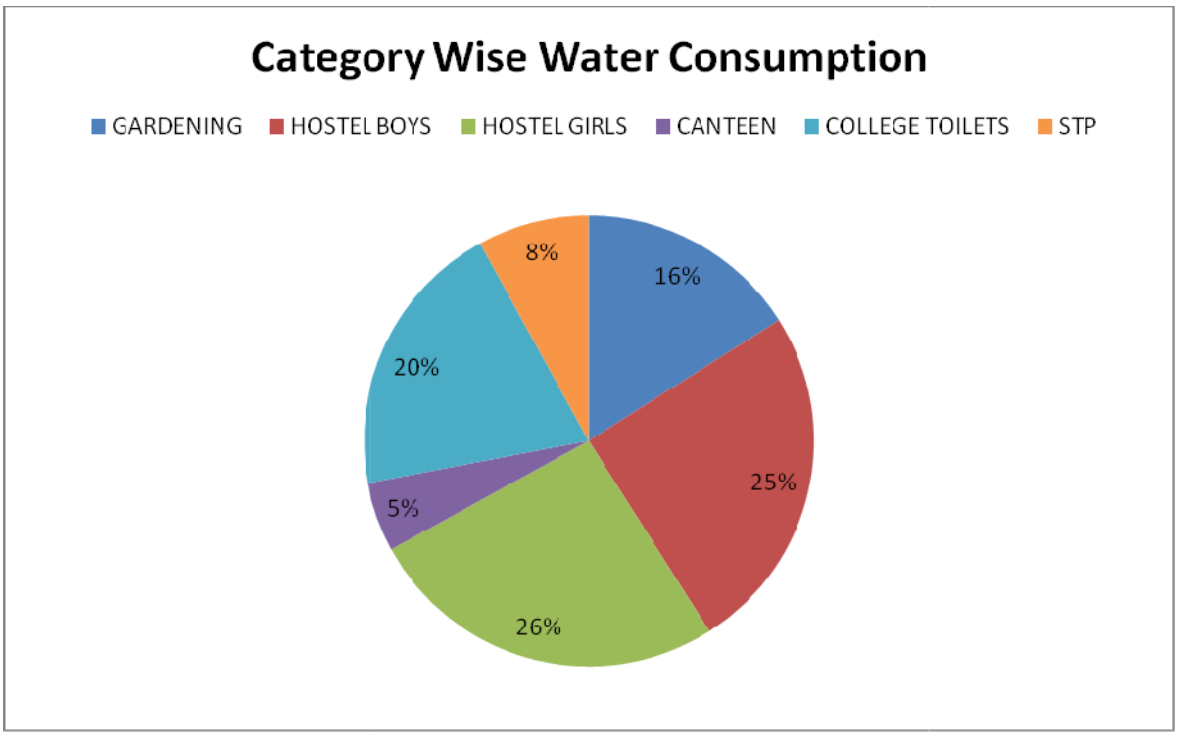

Fig 3 Pie chart of Average Category Wise Water Consumption

With the ardent desire to preserve natural resources especially water; the following effective measures are taken in this line in the Institution.

The rain water harvested from a roof of area of 1700 m^2, yielding about 15 m^3 of water per cm of rainfall is charged to a dug well after filtration in a vertical sand filter of 2.5 x 2.5 m^2 area and 1 m depth. The dug well with a diameter of 3 m and depth 3 m (volume 21.2 m^3) is provided with good sanitary protection to avoid any contamination with surface water. The filtered rain water stored in the dug well will recharge the groundwater. This facility is especially useful from August middle to January end during which the ground water flows to the nearby natural pond (12 x 17.6 x 7. cm) will be augmented. This natural pond is one of the sources well for the campus in which the water level depletes due to the termination of intense south western monsoon by the end of August. Arainfallof2-4cm/hrof20-30minutesdurationoccursatafrequencyof5–10timeseverymonth from September to December.

The development and constructional activities in the campus are made without disturbing the natural ghat terrain. All the buildings are constructed adopting terraced construction concepts

and mostly done along the contour of the terrace. This prevents loss of storm water through heavy surface runoff. Water collected from a total roof area of 4800 m^2 is permitted toflood in level courtyards of each building. This helps in percolation of rain water through soil thus recharging the groundwater.

Out of the total possible campus population of around 3100, four hostels accommodate 820 students. The wastewater generated by this population is approximately170 m^3/day (IS 1172-1993). The campus has a full-fledged Sewage Treatment Plant (STP) with an installed capacity of 300 m^3/day. The treated wastewater emanating from this plant well conforms to the effluent Standards of KSPCB for disposal into natural water bodies. This treated wastewater is used for irrigating the entire vegetation in the campus of 25.28 acres area.

The STP encompasses preliminary treatment like screen, grit chamber, oil separator etc followed by physicochemical treatment. The effluent is then subjected to secondary treatment employing Activated Sludge Process (ASP) ensuring substantial BOD removal. The following tertiary treatment consists of a second level physicochemical process followed by double filtration and then disinfection. The SS, COD, BOD, pH etc of the final treated effluent is routinely assessed in the Environmental Engineering Lab of the Civil Engineering Department of the College.

For the campus population of 3100, including 820 hostel inmates, the total water requirement is 220m^3/day (IS 1172-1993). This demand is met with the help of two water sources developed and maintained with atmost care.

The first source is a natural pond in the campus itself. All four sides of the pond are protected with dry rubble construction. Sufficient sanitary protection is ensured by providing solid parapet walls all around and required roof covering. This well of size 1200 x 1760 x 700 cm is capable of meeting the water demand of the campus from May middle to December of the year. The well is periodically cleaned and the water quality is regularly monitored in the Environmental Engineering Lab of the College.

Another water source is at Nadukkara, 2.5 km away from the campus. A dug well of

3m. diameter and 9 m depth is made by the side of the Thodupuzha river and required sanitary protection is provided with. Sufficient water is available in this well to meet the water requirement all through the year which is 30 m distant from the river. With the help of two 12.5 hp submersible pumps water is pumped to an intermediate concrete storage tank of 3 lakh liter capacity in the campus.

From the above storage tank or from the natural pond, water is pumped to an overhead tank of 2.5 lakh liter capacity from which water is supplied through gravity flow to the entire campus. Flow meters provided at appropriate locations in the distribution system help in practicing water auditing, as an effective means of water conservation. The water from both sources is of excellent quality and is in conformation with the drinking water quality standards specified by BIS and WHO.