

# **WATER AUDIT REPORT**

**B.C.S. GOVT. P.G. COLLEGE DHAMTARI,  
CHHATTISGARH**



**2023-24**

**Submitted  
To  
IQAC**

**BCS GOVT. PG COLLEGE DHAMTARI, CHHATTISGARH**

**By**

**WATER AUDIT COMMITTEE**

**WATER AUDIT COMMITTEE**

1. Dr. Rakesh Kumar Sahu

2. Ms. Aakanksha Markam

  
**PRINCIPAL**

**Dr. Shreedevi Choubey**

## CERTIFICATE

*This is to certify that BCS Govt. PG College, Dhamtari has conducted a detailed water audit of their campus and has submitted necessary data and credentials scrutiny. The activities and measures carried out by the college have been verified based on the report submitted and found satisfactory. The efforts taken by the institute and staff towards water conservation and awareness are appreciated and commendable.*

Place: Dhamtari

Date: 19.02.2024

*[Signature]*  
19.02.24.

Chemist  
Dist. Water Testing Laboratory  
Public Health Engg. Dept.  
Dist. Dhamtari (D.G.)

*[Signature]*  
19.02.24.  
Assistant Engineer  
Public Health Engg. Dept.  
Dist. Dhamtari (D.G.)  
Signature

# **WATER AUDIT REPORT**

**BCS GOVT. PG COLLEGE DHAMTARI, CHHATTISGARH**

**YEAR 2023-24**

## **EXECUTIVE SUMMARY**

The executive summary of the water audit report furnished in this section briefly gives the identified water conservation measures that can be implemented in a phased manner to water conservation and increase the productivity of the college.

In the previous year, improvements in fresh water monitoring system, dip water irrigation system, waste water treatment plant and some other suggestions were given (which are written below), but nothing has been done on them.

## **AREAS FOR IMPROVEMENT AND RECOMMENDATION FRESH WATER MONITORING SYSTEM:**

Collect RO rejected water from all RO drinking points and use it to utilize for toilet and washroom activity in the college.

Installation of “Cloud based ground water extraction monitoring system” for well to quantify fresh water consumption per day in the college.

Install water flow meters (Mechanical or Electronics) in distribution network, like college building, drinking and Gardening for quantity per day water consumption and waste water generation in the college campus.

## **DIP WATER IRRIGATION SYSTEM FOR GARDENING.**

Use dip water irrigation system for gardening. Waste water can be reuse for gardening purpose. It will reduce the fresh water consumption of college.

## **WASTE WATER TREATMENT PLANT**

Waste water generated from various departments and canteen should be collect in separate waste water collection tank. It should be treated in STP and ETP plants after that treated water reuse activity like gardening, toilet and wash room etc.

## **OTHER SUGGESTIONS**

Some of the very important suggestions are:

- Prepare the water management policy, and work towards creating and implementing a strategy to reduce the water consumption.
- Establish institutional ecology policy and set an example of environmental responsibility and practices of resource conservation, recycling, and waste management.
- Promote 3R education policy (reduces, reuse, and recycle) in campus.
- Ensure participation of students and teachers in local water issues.

## CHAPTER-1

### INTRODUCTION

#### 1.1 About College

**Vision:** The vision of the college is to make the students ideal citizen in the global challenging situations through value added and quality education. Dhamtari District is the gateway to tribal dominated Bastar and mainly agricultural district. Among the students in the college number of students of ST and Other backward class happens to be the largest. Many of the students belong to labour class family and farmer family as well. That's why the motto of the college is to provide quality education mobilizing the available resources so that the students are able to get employment.

**Mission:**

- The mission of the college is to provide value based education.
- To ensure exposure to the latest developments in various disciplines.
- To enhance employability skills of the students of the region.
- To generate a culture of hands on learning and research.
- To facilitate research in traditional and emerging areas.
- To strive to cater to the tribal and less privileged sections of society.
- To develop healthy & intimate relationship between the students & teacher.
- To develop Gender Equality & sexual Harassment free Environment in the college.

#### 1.2 About College Campus:

Campus Area	27.7 acres
Constructed building	01. Main Building, 02. Library Building, 03. I.T. Building, 04. Science Building (New Building), 05. Canteen, 06. Girls Hostel, 07. Sports Department, 08. Cricket Stadium
Class Rooms	3
Smart Class Room	02
Laboratories	07

Office	01
Department	11
Staff Room	01
Research Centre	02 (Hindi, Economics)
NCC Room	01
NSS Room	01
Rest Rooms (Toilet)	17+01 (For Divyang)
Girls Common Room	01
Store Room	02
Primary Health Centre	01
Garden	02
Botanical Garden	01
Open Play Ground	01
Two wheeler parking	01
Staff Vehicle Parking	01

### 1.3 Water Audit Team (Internal)

- **Dr. Rakesh Kumar Sahu**, Assistant Professor (Chemistry)
- **Aakanksha Markam**, Assistant Professor (Chemistry)

### 1.4 About Water Auditing

Water audits can be a highly valuable tool for institute in a wide range of ways to improve their energy, environment and economic performance, while reducing wastages and operating costs. Water audits provide a basis for calculating the economic benefits of water conservation projects by establishing the current rates of water use and their associated cost.

### 1.5 Objectives of Water audit

The general objective of water audit is to prepare a baseline report on water conservation measures to diminish consumption, improve quality and sustainable practices.

#### The specific objectives are:

- To monitor the water consumption and water conservation practices.
- To evaluate the quantity of water, usage, quantity of waste water generation and their reduction within the college.

## **1.6 Target Areas of Water audit**

This indicator addresses water sources, water consumption, irrigation, rain water, appliances and stuff aquifer depletion and water contamination are taking place at unique rates. It is therefore essential that any environmentally responsible institution should examine its water use practices.

## **1.7 Methodology followed for conducting water audit**

### **Step 1: Walk through survey**

- Understanding of existing water sourcing, storage and distribution facility.
- Assessing the water demand and water consumption areas/processes.

### **Step 2: Secondary Data Collection**

- Analyze significant water use and wastewater generation
- Field measurements for estimating current water use
- Metered & unmetered supplies.
- Understanding of “base” flow and usage trend at site
- Wastewater treatment scheme & costs etc.

### **Step 3: Site Water Audit Planning (based on site operations and practices)**

- Wastewater flow measurement and sampling plan

### **Step 4: Conduction of Detailed Water Audit & Measurements**

- Conduction of field measurements to quantify water/wastewater streams
- Establishing water consumption pattern
- Detection of potential leaks & water losses in the system
- Assessment of productive and unproductive usage of water
- Determine key opportunities for water consumption reduction, reuse & recycle.

### **Step 5: Preparation of Water Audit Report**

- Documentation of collected & analyzed water balancing and measurement details
- Projects and procedures to maximize water savings and minimize water losses.
- Opportunities for water conservation based on reduce/ recycle/ reuse and recharge options



## CHAPTER- 2

### WATER CONSUMPTION AND WASTE WATER SOURCES

#### 2.1. Details of Source of Fresh Water and Use Areas:

The main source of freshwater is Borewell. The freshwater is mainly used for drinking, housekeeping, gardening, domestic activity and new construction project. Details of the well and pumps are given in table 2.1

Table: 2.1 Details of Fresh water sources and Supply pumps

S. No.	Water Source	Location	Quantity
1	Borewell - 01	Back Site of Home Science Dept.	01
2	Borewell - 02	Near Library	01
3	Borewell - 03	Near Canteen	01
4	Borewell - 04	Near Home Science Dept.	01(Not Working)

#### 2.2. Water Accounting & Metering system:

To measure the consumption of water in the college, water flow meters are required at the water source, which were not observed.



**Figure: 2.1 fresh water supply from open well for college campus**

### 2.3. Water Storage Capacity in College Campus:

Table 2.2 Water Storage Capacity in college campus

S. No.	Departments	Capacity	Units	Tank Type
1	Library Building	1000 L	02	Overhead tank
2	IT Department	1000 L	02	Overhead tank
3	New Building	1000 L	03	Overhead tank
4	Main Building	1000 L	01	Overhead tank
5	Main Building	3000 L	01	Concrete water tank
6	Main Building (Near NCC Dept.)	1000 L	02	Overhead tank
7	Main Building (Home Science Dept.)	500 L	01	Overhead tank
8	Girls Hostel	1000 L	01	Overhead tank

### 2.4. Water use areas and taps in College Campus:

Water is preliminary used for drinking, washing, Toilet, gardening and Domestic activity. Audit team visited various departments and buildings to determine appliances.

The details of washroom, toilet and taps are given in table 2.3

S. No.	Location of taps	Fresh Water taps	RO Water Tap
MB ground floor			
1	Hindi Department	01	0
2	Economics Department	01	0
3	Home Science Department	01	0
4	Commers Department	01	0
5	Geography Department	01	0
6	Office	01	0
7	Staff Toilet	04	0
8	Boys Toilet	03	0
9	Indore ground	07	0
10	First aid room	02	0
11	PWD Toilet	02	0
12	Corridor (Ground floor)	-	01
MB 1st floor			
13	Sociology Department	01	0
14	Botany Department	07	0



15	Zoology Department	07	0
16	Political Science Department	01	0
17	Physics Department	02	0
18	Staff room	03	0
19	Girls washroom	05	0
20	Girls Common room	01	0
21	Corridor (1 <sup>st</sup> floor)	-	01
MB 2nd floor			
20	English Department	01	0
21	Boys Toilet	02	0
22	Corridor (2 <sup>nd</sup> floor)	-	01
Library			
23	Library (Outside)	02	01
24	Boys Toilet	02	0
25	Girls Toilet	02	0
IT Building			01
26	Staff Room	01	
27	Boys Toilet	02	
28	Girls Toilet	03	
New Building			01
29	UG Chemistry lab	18	0
30	PG Chemistry lab	03	0
31	Girls Washroom	08	0
32	Boys Washroom – I	07	0
33	Boys Washroom – I	07	0
Girls Hostel			
34	Girls Hostel (Total)	25	0
35	Canteen	03	0
	<b>Total No. of water Taps</b>	137	06

### 2.5. Fresh Water uses for Gardening:

The one of major contribution from fresh water consumption is watering for plants and garden in college campus.

### 2.6. Waste Water Generation sources:

At present waste water generated from various departments canteen, Mess, and like washrooms, hand wash and washing and RO rejected etc is discharge into drain line.

Some photographs of waste water generation sources are given in Figure. 2.2



**Figure: 2.2 Waste Water Generation sources**

### **2.7. Rainwater Harvesting System of the College**

The rainwater harvesting is a technique to capture the rainwater when it precipitates, store that charge the groundwater.

There are typically four components in a rainwater harvesting system:

- Roof Catchment
- Collection
- Transport
- Infiltration

If rainwater is not harvested and channelized its runoffs quickly and flow out through rain-water drains. For rain-water management the recharge pits, percolation pits and porous trenches are constructed to allow rain water to infiltrate inside the soil.







**Figure: 2.7 Rain water harvesting system in college campus**

## कार्यालय कार्यपालन अभियंता लोक निर्माण विभाग धमतरी संभाग-धमतरी (छ.ग.)

Phone no. :- 07722-235519

E-mail :- ee.dhamtari@nic.in

ज्ञाप क्र. 354 / शिल्प-22  
प्रति

धमतरी, दिनांक ११ / ०१ / 2022

श्राधाय,

डी सी एन शासकीय स्नातकोत्तर महाविद्यालय

जिला धमतरी (छ.ग.)


विषय :- महाविद्यालय परिसर में रेन हार्वेस्टिंग निर्माण संबंधी प्रमाण पत्र प्रदाय विषयक।

संदर्भ :- आशका ज्ञाप क्र. 1499/2022/धमतरी दिनांक 14.01.2022

— 000 —

उपरोक्त विषयवस्तु लेख है कि डी सी एन, शासकीय स्नातकोत्तर महाविद्यालय धमतरी में निर्मित रेन हार्वेस्टिंग का साईजल 1.50 X 1.50 मीटर जितकी लागत करीब रु. 25000.00 की है।

सहपत्र :- शून्य

  
 कार्यपालन अभियंता  
 लोक निर्माण विभाग धमतरी  
 संभाग-धमतरी (छ.ग.)

## 2.8. Water test parameter in the college water

Table 2.4 Water test parameter in college water

S. No.	Parameter	Test Sample -01	Test Sample -02	Test Sample -03	Unit
1	Source of sample	Deep Bore-well water supply	Deep Bore-well water supply	Deep Bore-well water supply	-
2	Sample Quantity	1 Litter	1 Litter	1 Litter	-
3	Analysis date	05.01.2024	05.01.2024	05.01.2024	-
4	Colour	3	5	3	Hazen
5	Odour	Agreeable	Agreeable	Agreeable	-
6	Taste	Agreeable	Agreeable	Agreeable	-
7	Turbidity	0.1	0.2	0.5	NTU
8	Chloride (as $\text{Cl}^-$ )	77.38	83.84	82.41	mg/L
9	TDS	178	172	172	mg/L
10	Total Alkalinity (as $\text{CaCO}_3$ )	52.00	56.00	50.00	mg/L
11	Calcium (as $\text{Ca}^{++}$ )	32.25	29.02	34.67	mg/L
12	Magnesium (as $\text{Mg}^{++}$ )	7.83	5.87	4.89	mg/L
13	PH	7.4	6.9	7.2	pH Scale
14	Total Hardness (as $\text{CaCO}_3$ )	112.89	96.76	106.84	mg/L
15	Specific Conductivity	273.85	264.62	264.62	mg/L
16	Total Coliform (per 100 mL)	NIL	NIL	NIL	-

**Observation:** Total 03 No. of water sample are tested. All parameter in Permissible range and water quality are good. Report is attached below.

**कार्यालय सहायक अभियंता  
लोक स्वास्थ्य यांत्रिकी उपखण्ड धमतरी , जिला-धमतरी (छ0ग0)**

पत्र क्रमांक 02 प्रयो.शा./स.अ./लो.स्वा.यां.उपखण्ड/2023-24 धमतरी दिनांक 05-01-2024

प्रति,

✓ प्र. प्राचार्य  
बो.सी.एस्.शा.स्ना.महा.  
जिला-धमतरी (छ0ग0)

**विषय :-** जल गुणवत्ता प्रतिवेदन देने बाबत।

**संदर्भ :-** आपका पत्र कं. 1595/परीक्षण/2024 धमतरी, दिनांक 02.01.2024

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उपरोक्त विषयान्तर्गत लेख है कि दिनांक 04/01/2024 को आपके द्वारा भेजे गये जल नमूनों का जल परीक्षण किया गया जिसकी जल परीक्षण प्रतिवेदन आपकी ओर सादर प्रेषित है।

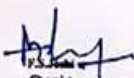
**सहपत्र :-** 03 सैम्पल का जल परीक्षण प्रतिवेदन।

  
सहायक अभियंता  
लोक स्वास्थ्य यांत्रिकी उपखण्ड  
धमतरी (छ0ग0)




District Water Testing Laboratory Public Health Engineering Department, Division Dhamtari Chhattisgarh Roshni Road Gokulpur Ward E-Mail: ee_she@dl.nic.in Phone: 07722-232422 Test Report															
Kind of Sample: Drinking Water		Report No./DL/PHED/DNT			Sample Collected By -			College Staff							
Sender Name and Address:		Sender letter no.		1595		Sender's Letter Date			02.01.2024						
Principal BCS Govt. P.G. College Dhamtari		Date Of Collection		02.01.2024		Sampling plan & Procedure No.			Not Done By Lab						
		DL Receipt No.		773		DL Receipt Date			04.01.2024						
		Date Of Analysis Started		04.01.2024		Date of Analysis Completed			05.01.2024						
No.	DISTRICT	BLOCK		VILLAGE		Location/Source									
1	Dhamtari	Dhamtari		Dhamtari		Borewell No 01									
2	Dhamtari	Dhamtari		Dhamtari		Borewell No 02									
3	Dhamtari	Dhamtari		Dhamtari		Borewell No 03									
Details of parameters, their test methods, unit and specification as per IS/APHA															
No.	Characteristics	Test Method IS 3025		Unit of Measurement	As Per IS-10500:2012 for Drinking Water		Results								
					Acceptable Limit	Permissible Limit	1	2	3	4	5	6	7	8	
1	Color	IS 3025	Part -04	Hazen	5-15	No Relaxation	3	5	3	-	-	-	-	-	-
2	Odour	IS 3025	Part -05	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	-	-	-	-	-	-
3	Taste	IS 3025	Part -06	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	-	-	-	-	-	-
4	Turbidity	IS 3025	Part-10	NTU	1.0	0.2	0.1	0.2	0.5	-	-	-	-	-	-
5	Chloride as Cl <sup>-</sup>	IS 3025	Part-32	mg/L	250	1000	77.38	83.84	82.41	-	-	-	-	-	-
6	TDS	IS 3025	Part-16	mg/L	500	2000	178	172	172	-	-	-	-	-	-
7	Total Alkalinity as CaCO <sub>3</sub>	IS 3025	Part - 23	mg/L	200	600	52.00	56.00	50.00	-	-	-	-	-	-
8	Calcium as Ca <sup>++</sup>	IS 3025	Part - 40	mg/L	75	200	32.25	29.02	34.67	-	-	-	-	-	-
9	Magnesium as mg <sup>++</sup>	IS 3025	Part - 46	mg/L	30	100	7.83	5.87	4.89	-	-	-	-	-	-
10	pH	IS 3025	Part - 11	pH Scale	6.5-8.5	No Relaxation	7.4	6.9	7.2	-	-	-	-	-	-
11	Total Hardness as CaCO <sub>3</sub>	IS 3025	Part - 21	mg/L	200	600	112.89	96.76	106.84	-	-	-	-	-	-
12	Iron as Fe <sup>++</sup>	IS 3025	3500-Fe-B	mg/L	0.3	1.0	-	-	-	-	-	-	-	-	-
13	Nitrate as NO <sub>3</sub> <sup>++</sup>	APIHA 23rd ed	4500-NO <sub>3</sub> -B	mg/L	45	45	-	-	-	-	-	-	-	-	-
14	Fluoride as F	APIHA 23rd ed	4500-F-C	mg/L	1.0	1.5	-	-	-	-	-	-	-	-	-
15	Sulphates as SO <sub>4</sub> <sup>2-</sup>	IS 3025	Part - 24	mM/l	200	400	-	-	-	-	-	-	-	-	-
16	Residual Chlorine	APIHA 23rd ed	Part - 26	mg/L	0.2	1	-	-	-	-	-	-	-	-	-
17	Specific Conductivity	IS 3025	Part - 14	µS/cm	500	2000	273.85	264.62	264.62	-	-	-	-	-	-
18	Total Coliform per 100 ml	24 Hrs			Nil	Nil									
		48 Hrs			Nil	Nil									
					Nil	Nil									

1. The report should not be produced partly or full without approval of signatory authority of legal purposes.  
2. It is recommended that acceptable limit is to be implemented. Values in excess of those mentioned under "acceptable" under the water not suitable, but still may be tolerated in the absence of an alternative source but upto the limits endorsed under the "permissible limit" in the absence of alternate source" in column 7 above which the sources will have to be rejected.  
3. The results refer only to tested samples and parameter tested.  
4. Samples will be stored for a period of 10 days from date of issue of report.  
5. This lab does not hold any responsibility for variation in results for samples kept on hold for want of clarification.  
6. The Laboratory does not hold any responsibility for variation in results for samples kept on hold for want of clarification.



Chemist  
Authorized Signatory  
District Water Testing Laboratory  
PHED Dhamtari (C.G.)



**Signature of Water Audit Committee**

**Dr. Rakesh Kumar Sahu, Assistant Professor (Chemistry)**

**Ms. Aakanksha Markam, Assistant Professor (Chemistry)**

Breese  
Markam.