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Estimation and Cost Analysis of Rainwater Harwesting,A Case Study on D.Y.Patil Knowledge City,Lohgaon(Dr.D.Y.Patil School of Engineering and Technology, Dr.D.Y.Patil School of Engineering,Dr.D.Y.Patil School of Architect, Dr.D.Y.Patil School of MCA,Dr.D.Y.Patil School of MBA,Dr.D.Y.Patil School of Diploma)

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Abstract: ***In the present study attempt has been made to examine the present status of water requirement and proposed rooftop RWH potential in the College campus. Dr.D.Y. Patil knowledge city loghaon located in Pune district has been undertaken for the present investigation. Dr.D.Y. Patil knowledge city is in abundance upstanding area; the average annual rainfall in the study area is maximum 863 mm. The proposed study is entirely based on primary and secondary data. Primary data collected form field work and secondary data collected from Socio – Economic Review and District Statistical Abstract of Pune, District Gazetteer and data have been collected from various published and unpublished thesis, articles, books, etc. Rooftop rainwater harvesting method is used in the present study. The per capita daily water requirement is calculated as number of persons x 5 liters. The annual, daily and dry day's water requirement has been calculated in liters. Runoff Coefficient and discharge estimated by using formula given by Darcy's runoff coefficient.Dr.D.Y.Patil knowledge city comprised with 102 acres of campus and 3417.85 sq.mt. m^2 area of roof surface. Population of college is about 4000 including students, teaching and non-teaching staff and daily visitors. Analysis revealed that 20000 l/d water required. Thus, the Rooftop RWH would be a solution for drinking and domestic water sustainability of the college in some extent. Results obtained from the present study suggested that Rooftop RWH method is more applicable in college campus.***

Keywords: RWH, Parameters of RWH, Design of RWH, Piping system, Constituent of RWH, System estimation of RWH.

I. INTRODUCTION

Water could be a one in every of the foremost necessary resources for survival of soul the maximum amount as food, air etc, however only a few attentions are procured its economical use and conservation of this precious resource. attributable to over pumping of water, the groundwater level goes down abnormally and if the matter isn't given a heavy look, then the longer-term generations might ought to face severe deficiency of water. precipitation is that the prime supply of water and if rain water is harvested, the deficiency of water is often eliminated altogether. this can be a perfect answer to beat water downside wherever surface water sources are short and inadequate groundwater provide quantitatively and qualitatively. RWH is that the method of assembling and storing water for future productive use. top side RWH is that the technique through that rain water is captured from the roof catchments and hold on in reservoirs. Case study of this project is AN institutional building within which six colleges i.e. Dr.D.Y.Patil school of engineering and technology, Dr.D.Y.Patil school of engineering,Dr.D.Y.Patil school of architect, Dr.D.Y.Patil school of MCA,Dr.D.Y.Patil school of MBA,Dr.D.Y.Patil school of diploma. it's large geographical area of "C" form.

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II. BACKGROUND

In that field 3500 No. of scholar's square measure learning and five hundred No. of colleges together with teaching and non-teaching employees conjointly. Total No. are 4000. Per capita demand for each day is 5 liter i.e. daily demand of water is 20000 liter/day. The daily demand of water should be full fill within the month of July to Dec. Then from this demand should be full fill by water tanker daily demand of this water is five tankers per day of capability 5000 liters. The full quantity spent on water is 450000rs/year conservation is associate degree act of protective resources from decay, loss or injury, otherwise to handle the resources with care and safeguard against destruction. Water is one among the renewable resources.

III. STATUS AND NECESSITY OF HARVESTING

I found immense water inadequacy in institute field. This institute have 102-acre field in this several buildings and gardens they additionally want water this immense quantity of water comes from lake for husbandry that is set at back facet of field however it absolutely was just for husbandry. the matter is remaining same for college kids and colleges.Rain water harvesting is a better way to reduce this problem it also helps in increasing the soil moisture condition and fertility factor of soil for plantation. Hence, this simple technique tends to increase the greenery surrounding the campus, increasing aesthetic factor for a proper residential institute to live in. Thus, in that similar way, rainwater harvesting systems has endless advantages without any harmful disadvantages or if there are any, then it must be negligible. Hence for water scarcity, Rainwater harvesting is seeming to be a perfect replacement for surface & ground water as later is concerned with the rising cost as well as with ecological problems. Therefore, Rainwater harvesting is highly recommended for campus of Dr.D.Y. Patil College of engineering Pune. this problem is also being profoundly seen in inside the campus. And, if it has not been dealt earlier with proper care then this problem will become a major hurdle in the development phase of campus and the standard of living of will declining. Hence, keeping in view all the above problems and status of campus, college administrative body should focus more on the water scarcity problem.

IV. OBJECTIVES

A. To study the water scarcity in Institute Campus.
B. To study the money associate with water.
C. To understand the basic concepts of hydrology for optimum design of rain water harvesting.

V. DETAIL ESTIMATION

TABLE I Detail Estimation Of Sump

Sr.no	Particular	No	Length(m)	Breadth(m)	Depth (m)	Quantity(m^3)
1	Earth work in excavation	1	16.80	10.80	4.3	780.19
2	Cement concrete 1:3:6 in foundation	1	16.80	10.80	0.3	54.43
3	Ist class brick work in 1:4 cement mortar i. Long wall II.short wall	 2 2	 16.60 10	 0.30 0.30	 4 4	 39.84 24
					Total	63.84
4	R.C.C work for slab cover	1	16.80	10.80	0.2	36.29
5	12mm plastering 1:2 cement mortar i.long wall ii.short wall	 2 2	 16 10	 - -	 4 4	 128m^2 80m^2
					Total	208m^2

TABLE II Abstract of Estimation Cost

Sr no	Particular	Quantity	Rate	Cost (Rs)
1	Earthwork in excavation	780.19 m^3	138	107666.22
2	Cement concrete 1:3:6 in foundation with brick ballast	54.43 m^3	5000	272150
3	I class brickwork 1:3 cement mortar	63.84 m^3	5000	319200
4	R.C.C work for slab cover	36.29m^3	4800	174192
5	12mm plastering with 1:2 cement mortar	208m^2	450	93600
			Total	1046808.22
	Contingency+workcharges establishment	(3+2=5%)		52340
	Engineering profit	10%		104680.80
			Grand Total	1203830

TABLE III Estimation of Piping System

Sr no.	Description of material	No	Length	Rate Rs/m	Amount
1	P.V.C. Pipe of diameter 90mm		230m	150	34500
2	Main collecting pipe of material P.V.C. diameter 150mm.		30m	222	6660
3	L-bow	40	-	35	1400
4	T-s	15	-	42	630
5	Miscellanies 5% + proffit 10%	-	-	-	6347.25

TABLE IV Estimation Of Piping System

Sr no.	Description of material	No	Length	Rate Rs/m	Amount
1	P.V.C. Pipe of diameter 90mm		230m	150	34500
2	Main collecting pipe of material P.V.C. diameter 150mm.		30m	222	6660
3	L-bow	40	-	35	1400

4	T-s	15	-	42	630
5	Miscellanies 5% + proffit 10%	-	-	-	6347.25
				Total	49537.25

TABLE V Estimation Of Water Filter

Sr No.	Description of material	No	Length	Breadth	Height	Quantity
1	1st class brick work Long wall Short wall	 2 2	 3.5 2.85	 0.3 0.3	 1.5 1.5	 3.15m^3 2.65m^3
					Total	5.71 m^3
2	Aggregate for filter consider Pebbles Aggregates Sand	1 1 1	3.5 3.5 3.5	2.85 2.85 2.85	0.4 0.4 0.4	3.99 m^3 3.99 m^3 3.99 m^3
					Total	11.97 m^3
3	Plastering 12mm thk with 1:3 CM 1)Internal Long wall Short wall 2)External Long wall Short wall	 2 2 2 2	 3.5 2.85 3.5 2.85		 1.5 1.5 15. 1.5	 5.25m^2 4.28 m^2 5.25 m^2 4.28 m^2
					Total	19.06 m^2

TABLE VI Abstract Table

Particular	Rate
Water tank	1203830
Water filter	49578.8
Piping system	48662.25
Total	1302070.5

VI. CONCLUSION

In the Broach campus, the consistently demand of water must be full fill in the period of winter and summer. Rainwater harvesting is turn on the waterworks a ‘silver bullet’, but can be effective as a classify and practicable stand-in to large-scale water

withdrawals, and as a way of reducing the negative impacts on ecosystem services, not least in emerging water stressed basins. This regulation comes casual of cost in 3 years from above calculations it decreases lots of water dependency of our institute.

It over divagates rainwater harvesting, if conserved and acclimatized using the harvesting technology, it in truth be a lively tool of replenishing parade conduit resources. Rainwater harvesting is a coping strategy in variable drizzle areas. In the destination express adaptation, firmness pile rainfall variability and evaporation and population growth will-power increase inclination on ecosystem services.

Rainwater harvesting will become a key intervention in adaptation and reducing vulnerabilities. Surrogate intervention of brute preservation divulge ground water regenerate, construction of lakes, tanks, water structure are effective but these structures are associated the simple tool for water conservation.

VII. ACKNOWLEDGEMENT

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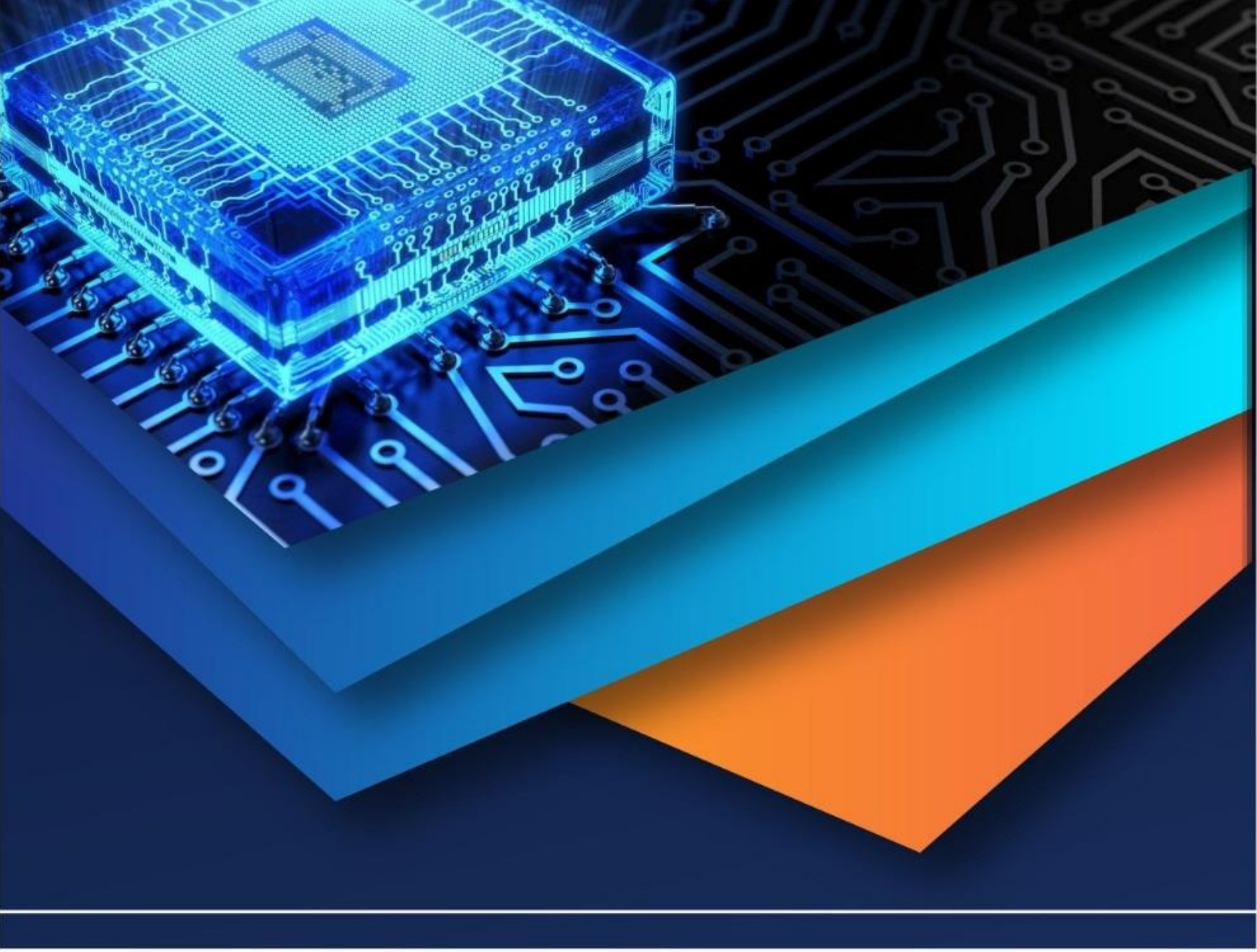

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