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# Ground Water Utility in Most Economical Way

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**Abstract—***Ground water is one of the primary source of water, 0.6% is in ground water form but unfortunately, it has been getting polluted day by day due to different anthropogenic activity.*
*There should be proper water quality investigation and management for deciding it improved reusability aspects. We studied primarily the ground water table of area and collected water from different water as the site has been excavated 12m deep inside the earth surface, different location of site. This case study is from SUVARNREKHA DINNING HALL, PUNE.*
*Methodology adapted that consisted of various tests like pH ,Alkalinity, Harness test which are require for testing basic quality of water. After performing test pH of ground water is 7.7,alkalinity is 187.98mg/l of $CaCO_3$ and hardness is 269.8mg/l of $CaCO_3$which satisfy the standard condition as specified byBIS, GOI, WHO.*
*Thus we can utilise the ground water from the site for various purpose like, curing, household purpose, water proofing, and government infrastructure landscape. By adapting above mentioned perception of ground water utility green credits can be earned by builder /client/construction group from LEED, TERI, IGBS, and GRIHA... etc.*
*It can become economically viable along with improving the market image.*

## 1. INTRODUCTION

It is burning need, to conserve the water and prevent it from every type of pollution. Ground water has been the primary source of water supply for domestic, agricultural and industrial uses in Maharashtra. It is the single largest and most readily available source of irrigation and more than 55% of the total area under irrigation depends on ground water sources. Nearly 70% of rural water supplies are based on ground water. Thus ground water plays a very important role in the state's economy and therefore needs to be monitored scientifically both in terms of quality and quantity, for sustainable development and management.

The water obtained from the excavation during any construction project which is part of groundwater is being wasted i.e. simply drained out, in some places they use this water for curing and some other construction works and the excess is wasted. In order to avoid such a huge wastage of water proper management is necessary. For this detailed study of the site, water available, its properties as well as its economical usage is necessary.

## GROUND WATER SCENARIO IN MAHARASHTRA STATE

About 85% of the state is covered by Deccanbasalt, so based on the hydrogeological properties of different rock formation, the state can be divided into three major groups namely unconsolidated ,semi consolidated ,consolidated graph.

**Table 1.1: Ground Water Scenario of Maharashtra**

| | |
|---|---|
| Area (Sq.km) | 3,07,713 |
| Rainfall (mm) | 1433 |
| Total Districts / Talukas | 35 districts / 231 Talukas |

**Table 1.2 Dynamic Ground Water Resources**

| | |
|---|---|
| Annual Replenishable Ground water Resource | 32.96 BCM |
| Net Annual Ground Water Availability | 31.21 BCM |
| Annual Ground Water Draft | 15.09 BCM |
| Stage of Ground Water Development | 48 % |

**Table 1.3: Ground Water Development & Management**

| | |
|---|---|
| Over Exploited | 7 Talukas |
| Critical | 1 Taluka |
| Semi- critical | 23 Talukas |
| Ground Water User Maps | 34 districts |
| Artificial Recharge to Ground Water (AR) | • AR: 65267 sq km |

### Enactment of Ground Water Bill to regulate and control the development of ground water:

Maharashtra water Resources Regulatory Authority Act was enacted in May 2005 and the state government is considering amending this act to incorporate the provision included in the mobile bill circulated by ministry

**Inclusion of Roof Top Rain Water Harvesting (RTRWH) in Building by Laws**

Maharashtra government is promoting RTRWH under the "shivkalim pani sthawan yojana".It provides that all houses should have provision for rainwater harvesting without which house construction plan should not be approved .Bombay municipal corporation and pimpri-chinchwad municipal corporation have made RWH mandatory by enacting building bye-laws.

## 2. METHODOLOGY

### 2.1 Experimentation

In order to utilize the excess groundwater proper investigations are to be carried out. To proceed further, study of ground water table is necessary. Site are to be surveyed having ample amount of groundwater. Collecting the data about quantity of water used at the site and the excess discharged or drained out per day. Need to know the estimated project duration (approximately 4-5 yrs.).

Tests are to be carried out to determine the quality of water which will help us to know the purpose exactly. Groundwater samples are to be collected from each site with available groundwater. Various tests are to be conducted according to the IS specifications.

Material Specification:

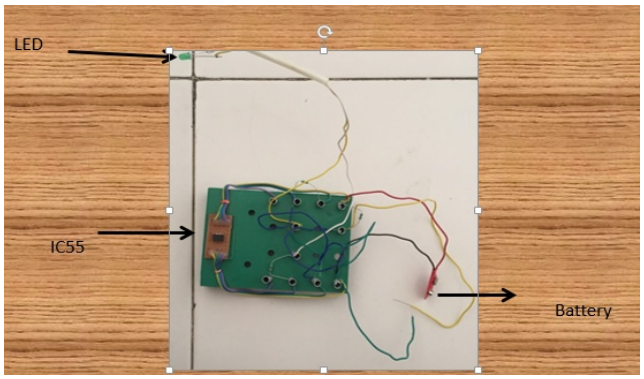
**IS 10500(2012): Drinking water specifications**, according to the specifications the water samples are need to be tested as well as the purpose i.e. domestic use, industrial use or in construction field can be identified on the basis of the results obtained.

1) Horizontal pressure filter: Horizontal Pressure Filters operate like other pressure filters although the horizontal configuration increases filtration area per footprint. Multiple cells can be installed in a single vessel to allow operating flexibility and backwashing from in-service cells. Over 4 MLD, they are more economical than several vertical pressure filters.

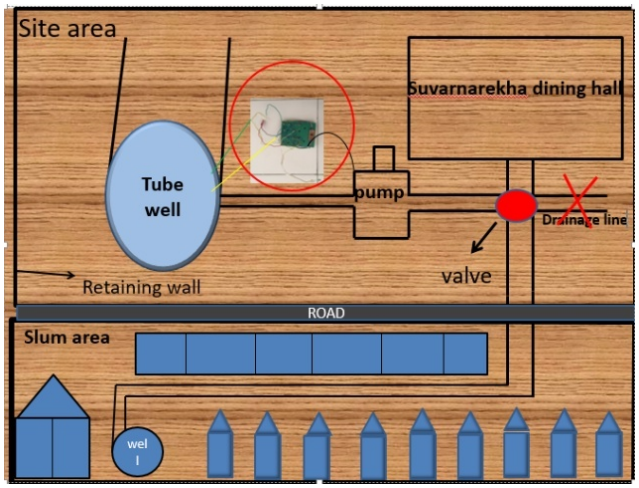
2) Ring well: A ring well is constructed by excavating a shaft, generally manually and installing a casing where needed.
Its diameter is 6m and depth 12m to store ground water obtained at the site.

***Setup***

**1. Water level sensor board**




**2. Site Area**




## 3. RESULTS

**1. pH results of the sample**

| Sr. no | Description of sample | pH value pH meter | Temp °C |
|---|---|---|---|
| 1. | Tap water | 7.9 | 21.5 |
| 2. | Aqua guard | 7.5 | 21.5 |
| 3. | Prepared Sample 1 | 1.8 | 21.5 |
| 4. | Prepared Sample 2 | 11.9 | 21.5 |
| 5. | Hot water | 5.8 | 67.5 |
| 6. | Ground Water | 7.7 | 20.6 |

**2. Alkalinity result of the sample:**

| Sr. No. | Sample Description | Temp | X ml | Y Ml | Alkalinity mg/l as CaCo3 | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | PP | TOTAL | OH | CO3 | HCO3 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Tap Water | 21.56 | 0 | 0.9 | 0 | 36 | 0.011 | 0 | 35.98 |
| 2 | Aqua guard | 21.56 | 0 | 0.9 | 0 | 36 | 0.029 | 0 | 35.971 |
| 3 | Prepared Sample | 21.56 | 0.7 | 7.1 | 28 | 256 | 2.33 | 51.34 | 202.3 |
| 4 | Ground water | 20.6 | 0 | 4.7 | 0 | 188 | 0.017 | 0 | 187.98 |

**3. Hardness test results**

| Sample no. | Sample Description | Total Hardness(mg/l) as CaCO3 | X Ml | Y Ml | Z Ml |
|---|---|---|---|---|---|
| 1 | Aqua guard | 0 | 0 | 0 | 10.2 |
| 2 | Tap Water | 7.84 | 0.2 | 0 | 10.2 |
| 3 | Prepared Sample | 486.08 | 12.4 | 0 | 10.2 |
| 4 | Ground Water | 269.8 | 7.1 | 0 | 10.2 |

## 4. CONCLUSION

From the results obtained, water can be utilized according to the suitability in various ways for many useful purposes. In India, industry is the second highest consumer of water.

Choice of source of water depends on the availability of sufficient and regular supply of water and the cost of water from the source.

In case of groundwater, excavation charges etc. causes high cost taking that in account the water obtained from excavation at any construction site can be also sold at prices less than the market price which is economical to both buyer as well as seller.

This can avoid unnecessary wastage of water and can provide a source of income to the firm as well.

Since the surface water supply from municipal sources is not sufficiently guaranteed, industrial units tend to depend on groundwater. This is one of the best solutions to utilize groundwater here.

If the quantity obtained is not sufficient to provide it to any industry, then the water obtained can be supplied to any nearby area for any domestic use, through temporary distribution system or with the help of tankers at places facing water scarcity.

## 5. ACKNOWLEGMENT

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