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DESIGN OF SOFTWARE BASED WATER DISTRIBUTION SYSTEM FOR A VILLAGE

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Abstract:-

The sustenance of life depends on water, a fundamental ingredient. With a matching rise in population, the demand for water is continuously rising. This constant demand can be met by creating effective water distribution networks based on cutting-edge computing technologies, including contemporary hydraulic modelling. In the current study, the Ratnappa Kumbhar Nagar region of Morewadi grampanchayat's, Kolhapur district Maharashtra state, India of water distribution network is constructed. The current population, the population during the previous three decades, the daily water demand, flow characteristics, as well as a survey of the study area using digital GPS, are all taken into consideration while designing the water distribution network for Ratnappa Kumbhar Nagar. Using Bentley's WATERGEMS programme, the communities' water distribution network is evaluated and created. network for distributing water effective software for design of water distribution system for Ratnappa Kumbhar Nagar. Water distribution system here is designed to provide each individual customer with water that is sufficient in quantity, quality, and pressure from a source and to tackle the situation of intermittent water supply and also with the goal of achieving 24x7 water supply with enough water pressure to meet demand.

1. Introduction:-

All living things require water, and it is crucial for the socioeconomic development of a nation. A water distribution network is a crucial piece of infrastructure for water supply. For the current study of the design of the water distribution network for the Ratnappa Kumbhar Nagar, Kolhapur is regarded as a developing neighbourhood. Ratnappa Kumbhar nagar is considered to the most ancient housing society area of Asia makes a lot of efforts in development of living standards of Kolhapur. A significant component of it is the delivery of water. Every citizen receives enough quality services at the lowest possible cost, yet the quantity is insufficient. According to our survey and statistics from official organisations, the amount of water given to consumers is insufficient The locality Ratnappa Kumbhar Nagar falls in Kolhapur district situated in Maharashtra State situated at a height of 563 meters above mean sea level and 16°65' North latitude and 74°24' East longitude. It comprises of seven sub-housing societies, consisting of 200-225 residential plots each and 20-30 commercial plots. It was founded in the year 1969 and is considered as Asia's largest housing society, the population of R.K Nagar area is around 10500. Presently this area is served by municipal water supply (that comprises 5% of total water supply) and Maharashtra Jeevan Pradhikaran (MJP) water supply (which comprises of 95% of the total water supply) on alternate days which has lead to reliability of the people on bore water which may lead to problems like ground water depletion and health issues as kidney stone among the people living the locality

1.2 Objective of study:-

1.2.1 To study the water requirement of the area in context with living standards

1.2.2 To investigate any deficiencies in present water distribution system to satisfy per day demand

1.2.3 To design suitable software based water distribution system for 24 x 7 water supply

2. Study area:-

The area selected for this project is Ratnappa Kumbhar Nagar (R.K Nagar), Kolhapur. The locality Ratnappa Kumbhar Nagar falls in Kolhapur district situated in Maharashtra State situated at a height of 563 meters above mean sea level and 16°65' North latitude and 74°24' Eastlongitude.

Figure 1:-Study Area

3 Research Methodology:-

3.1) Area/ Zone Selection:-

The area selected for study is decided after considering the water distribution problem i.e.; intermittent water supply. Ratnappa Kumbhar Nagar, Kolhapur is the study area.

3.2) Data Collection:-

Obtaining google image of the selected area, Water use survey, Current population, General layout map, current water supply details, existing water distribution layout map, Elevation of water distribution nodal points etc.

3.3) Data Analysis:-

Population forecasting of the area, Water quality tests of current water supply (tap water and ground water).

3.4)Study of suitable software:-

The software available for designing water distribution system are studied to determine the suitable software.

3.5) Preparation of necessary maps

3.6) Designing a suitable water distribution system for 24x7 water supply.

4.Watergems:-

Many have characterized Geographic Information Systems (GIS) as one of the most powerful of all information technologies because it focuses on integrating knowledge from multiple sources and creates a crosscutting environment for collaboration. GIS is a system for the management, analysis, and display of geographic knowledge, which is represented using a series of information sets. GIS can be used to organize the data for usage in water distribution networks design, and analysis. In addition, GIS is used as a tool for number of created applications for network management; such as identifying valves to be closed in case of pipe break, service area for treatment plants, and network skeletonization. Finally, GIS is used to provide graphical display of results obtained from both hydraulic simulation, and optimization models; linking tabular data with geographic locations, and graphical drawing.

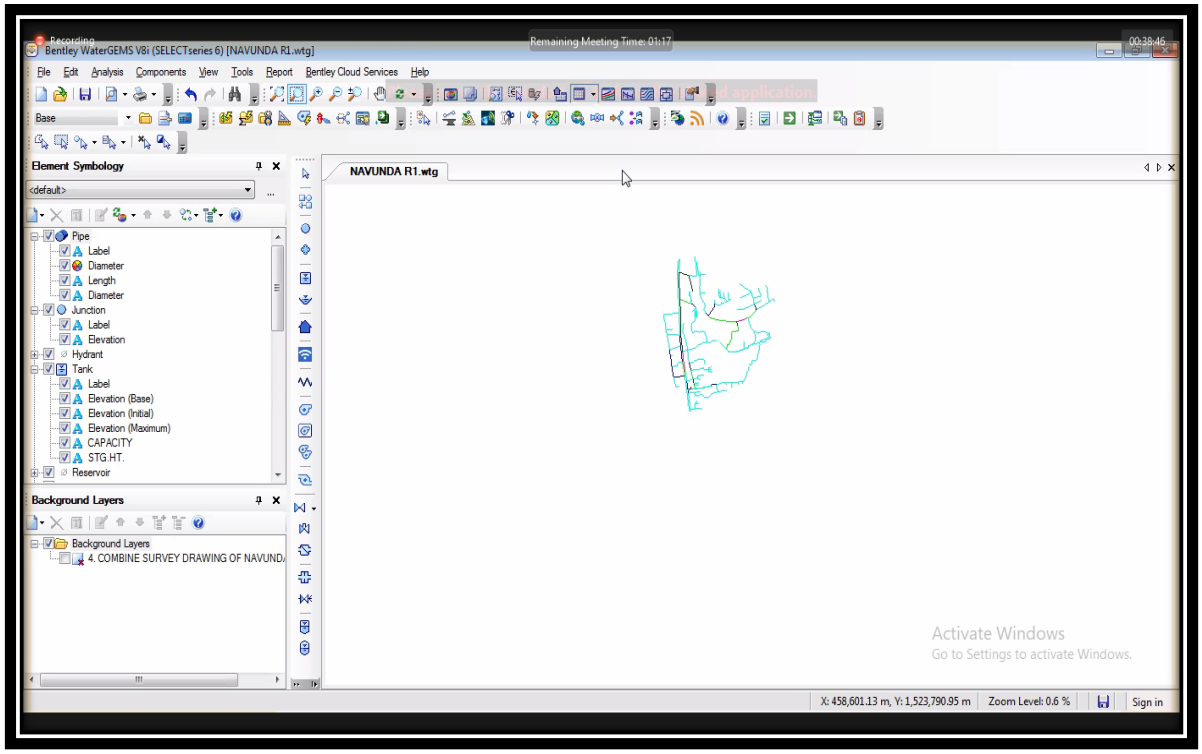

Figure 2:-WATERGEMS window

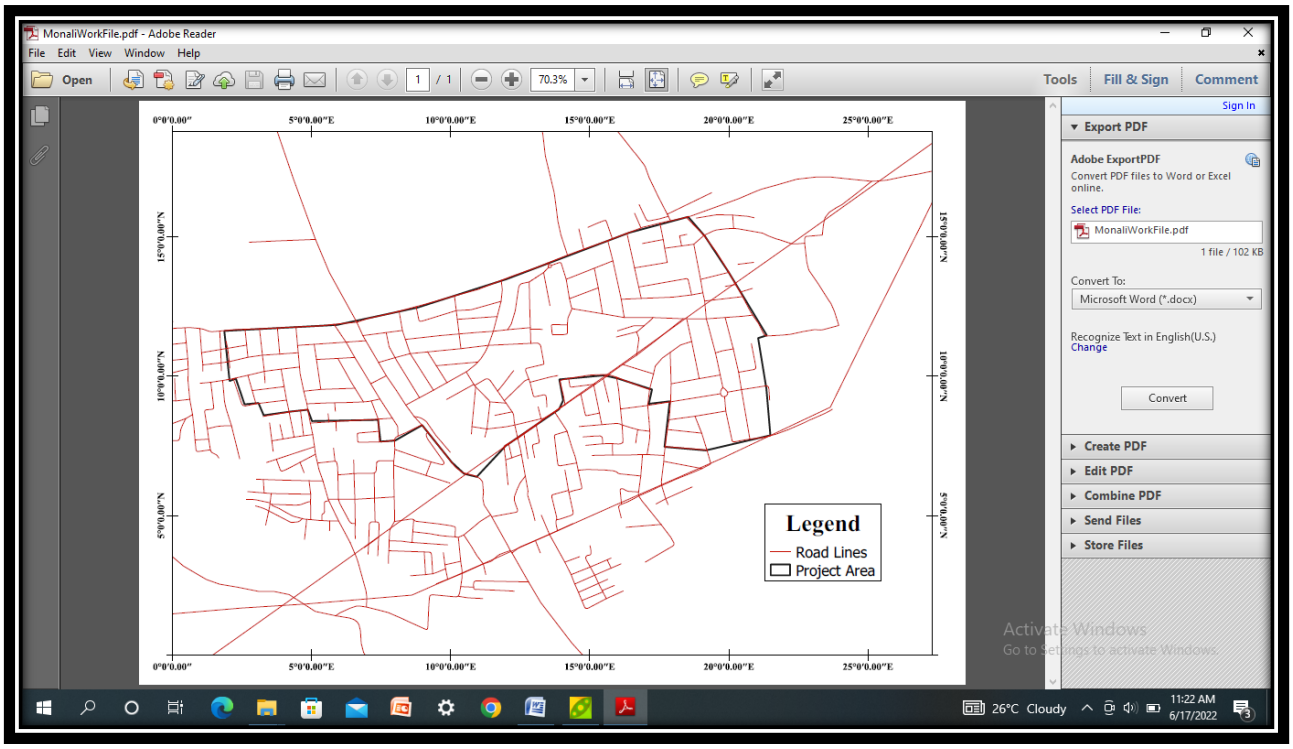

Figure 3:- Roadmap of study area

5. Results and Discussions:-

Data collected is analysed in watergems software and results are obtained as follows:-

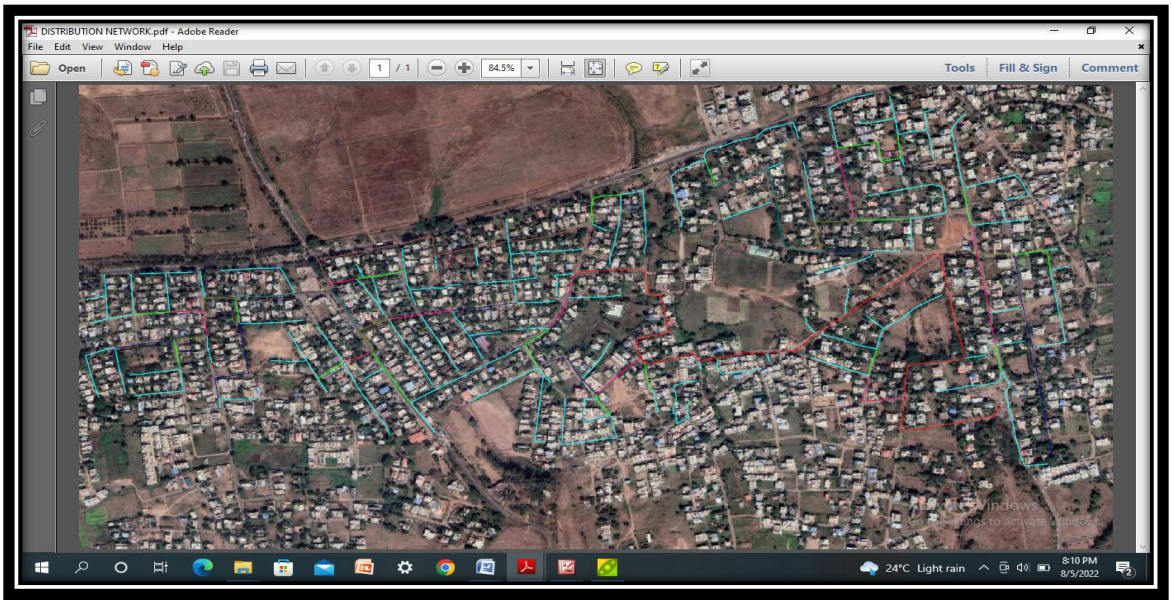

Figure4:- New Pipe Network

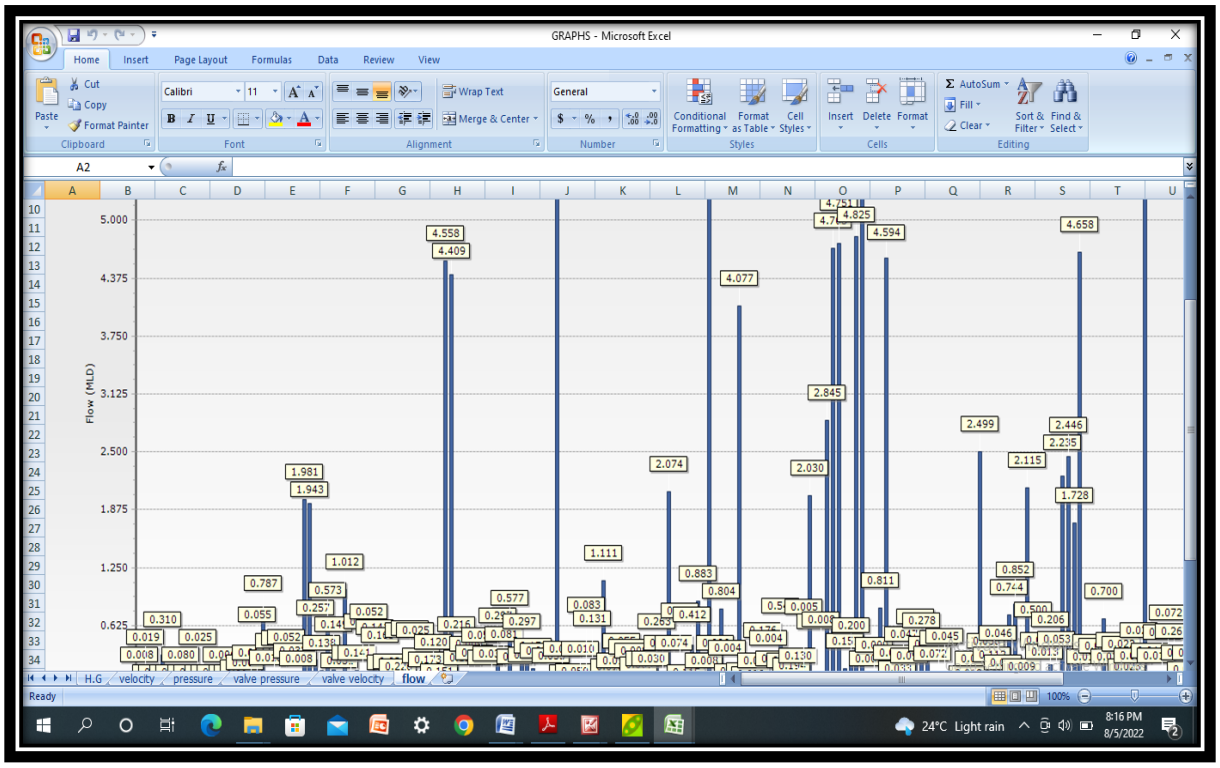

Figure 5 :- Pressure Profile

Conclusion:-

The purpose of the study was to design a 24x7 software based water distribution system for R K Nagar area, In this study it was observed that the present water supply for the area is not satisfactory in terms of quantity and hence by considering the present water demand of R K Nagar area it has become essential to install a new water distribution network, In order to achieve this requirement the proposed network is designed and should be effectively implemented to meet the water requirement of the area with adequate pressure

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