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ADVANCED SURVEYING USING TOTAL STATION

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Abstract –Total station is a instrument used for surveying purpose. Using this instrument we can do any type of surveying. In this paper, we surveyed whole area to generate pumping system for the community. Initially we surveyed the total community to determine the different reduced level for the location of tank, using those reduced values for arranging pipeline system throughout the area, and also we prepared layout of the community.

1. INTRODUCTION OF TOTAL STATION:

Total station is a surveying equipment combination of Electromagnetic Distance Measuring instrument and electronic theodolite. It is also integrated with microprocessor, electronic data collector and storage system. The instrument can be used to measure horizontal and vertical angles as well as sloping distance of object to the instrument.

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COMPONENTS:

- EDM
- Electronic theodolite
- On-Board Micro-processor
- Data collector (built in or separate unit)
- Data storage (internal or memory card)
- Prisms

2. WORKING PROCEDURE:

To use the total station, it is set over one end of the line to be measure and some reflector is positioned at the other end such that the line of sight between the instrument and reflector is unobstructed.

The reflector with prism attached to a detail pole. The telescope is aligned and pointed at the prism. The measuring sequence is initiated and a signal is send to the prism and a part of this signal is returned to the total station. Then analyzed this signal to calculate slope distance with horizontal and vertical angle. It takes only few seconds for calculations.

3.FUNCTION:

Distance measurement:

The instrument measure the distance from prism to station with accuracy.

Angle measurement:

Use to measure the angle in accuracy of 0.5 arc-second.

Coordinates:

It is a point which gives the position of the location where the instrument is setup.

3.3.1 Types:

- Global coordinate system
- Indian coordinate system
- Project coordinate system

4. TYPES OF TOTAL STATIONS:

- Manual Total station.
- Semi-automatic Total station.
- Automatic Total station.
- Servo-driven Total station.

5. USES:

- Area calculation.
- Boundary marking.
- Leveling the surface.
- Putting the Topographical map and contouring map.
- Building marking.

6. ADVANTAGES:

- Accuracy is high.
- Manual errors involved in reading and recording are eliminated.
- Calculation of coordinates is very fast and accurate even corrections for temperature and pressure are automatically made.
- Field work is very easy and fast.

7. SOFTWARE:

Software using for taking points and putting layout, the different software used are

- E-Surveying:

This software used to transfer data to plot the points in CADD.

- Survey-pro:

This software used for operating the total station and taking points or data for the field work.

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8. RESULT:

POINT	NORTH	EAST	ELEVATION
1	1021.21	936.4104	98.32
2	1019.859	940.3849	98.2
3	999.6647	939.0672	96.62
4	1002.777	936.228	96.65
5	994.4495	935.7033	96.21
6	995.8468	931.9733	96.09
7	955.3408	866.5123	94.24
8	956.524	860.8574	94.19
9	945.3217	851.1613	94.72
10	1016.149	947.0271	97.95

9.ANALYSIS OF DATA AND PROJECT FORMULATION:

- Estimate the future population of the community and study the local conditions.
- Locate the source or sources of adequate quality water , so as to fulfil needs of the community.
- Make provision for the necessary storage of water.
- Design the distribution system including the storage facilities, pumping stations, layout and sizing of pipe networks, location of fire hydrants and other valves, etc.
- Make provision for establishing an organisation which will maintain and operate the various units of the waterworks

10. PUMPING SYSTEM:

Pumping system is a term which indicates the materials fixtures used in a installation and maintenance.

TYPES OF PUMPS:

- Roto-dynamics pumps
- Displacement pumps

11.DATA COLLECTION:

- Population
- Water requirement
- RL values
- Location and size of tank
- Dimensions of pipe

11.1. CALCULATION OF WATER DEMAND

no. of houses = 54

populations = 54*4= 216

one person = 135 litres

total litres = 216*135= 29160 litres

specific capacity = 29160*1000= 29160000 cc

length = 1.5 times of breadth

breadth = height

rectangular tank = b*l*h

=1.5 b^3

1.5 b^3 = 29160000

b = 268.884 cm

l = 1.5*268.884 cm

l = 403.3264 cm

h = 268.884 cm

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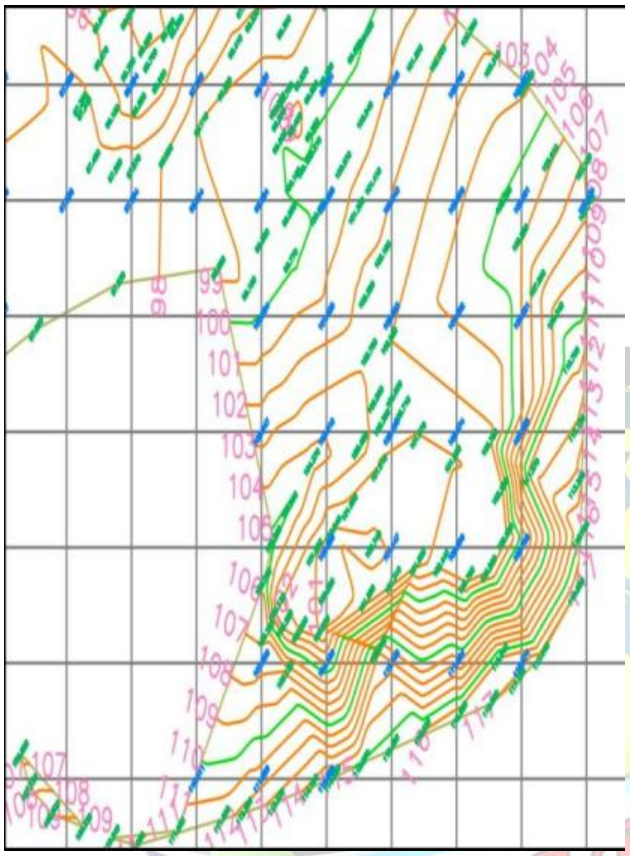
12.PROJECT DAIGRAM:

CONTOUR MAP



13.DISTRIBUTION OF WATER:

Water is distributing to the village by gravity flow method. Excavate ground level upto 3 feet's depth which is parallel to road surface. From the road the pipe is placed at 0.5m.

13.1.DIMENSIONS OF PIPE

Main pipe = 160 mm diameter

Street line = 110 mm diameter

Distribution line = 25 mm diameter

14. CONCLUSION:

From above details we finally using the RL values 0f community to design the layout and also pipe line route for distribution of water to the community.

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