At first we placed the instrument in such a position from where the maximum number of observations could be taken.
The instrument was placed on a tripod stand. The legs of the tripod stand was stretched at suitable height and the two legs of the tripod stand were fixed while the other one was moved in and out until the spirit bubble was at the center. Leveling was done with the help of spirit bubble by the movement of the foot screws of the instrument inward or outward and once the spirit bubble is in the mid portion or center the foot screws were tightened and the instrument was fixed.

After leveling the eye piece adjustment was done by rotating the focusing screw clockwise or anticlockwise until the cross hair can be seen clearly.

After doing all the adjustments, the staff readings were taken. The staff readings were taken at an interval of 10 meters.

The staff readings were recorded in a tabular format and the elevations (or the reduced levels) of the sections were calculated by Height of Instrument method.

2.3 Measurement of dimensions of the storm drain

At each section, the width, overall depth and the wetted depth was measured using a bamboo and a 5m steel tape. The observations were noted in a tabular format and the wetted perimeter and the area of flow was calculated.

2.4 Calculation of velocity of flow

The velocity of flow was calculated using two formulas given by Manning and Chezy.

2.4.1 Manning's Formula
Irish engineer Robert Manning (1891) gave a formula for velocity of flow in open channel. [1], [2], [4]

$$V = \frac{1}{n} R^{2/3} S_b^{1/2}$$

V= Velocity of flow
R= Hydraulic radius
S_b= Bed slope
n= Roughness coefficient or rugosity coefficient
The roughness coefficient mainly depends on surface roughness and factors like vegetation cover, cross-sectional irregularity, channel silting, scouring, obstruction and stage or depth of flow.

2.4.2 Chezy's formula:
A formula for calculation of velocity of flow was given for uniform flow in open channels by the French Engineer Antoine Chezy (1769). [1], [2], [4]

$$V = C\sqrt{RS_b}$$

V= Velocity of flow
C= Chezy's coefficient
R= Hydraulic radius
S_b= Bed slope
The value of Chezy's coefficient 'C' can be calculated by the Ganguillet-Kutter formula as follows:

$$C = \frac{23 + \frac{0.00155}{S_b} + \frac{1}{n}}{1 + \left(23 + \frac{0.00155}{S_b}\right)\frac{n}{\sqrt{R}}}$$

Where n= Roughness or rugosity coefficient
R= Hydraulic radius = $\frac{Area\ of\ flow}{Wetted\ Perimeter}$
S_b= Bed slope [1], [2], [4]

2.5 Calculation of discharge

After the calculation of velocity of flow was done, the discharge for each section was calculated. The discharges were noted in a tabular form and the maximum discharge was noted. The discharge was calculated by the following formula:

$$Q = AV$$

where Q= Discharge through the section
A= Area of the section
V= Velocity of flow through the section [1], [2], [4]

3. Results and discussions

3.1 Data considered

The catchment area, coefficient of runoff and Manning's rugosity coefficient have been considered from the Conceptual Detail Project Report (DPR) for Implementation of Pilot Project, [5], [6] and are given as follows:

- Catchment Area = 22.9 hectares
- Coefficient of runoff = 0.4
- Manning's rugosity coefficient = 0.015
- Bed slope, S_b = 1 in 3000

3.2 Measurement of Dimensions

The dimensions of the rectangular channel were measured at intervals of 10m and were noted in a tabular format. [7][8]

3.3 Calculation of Reduced Level

The reduced level of the different sections was calculated and noted down in a tabular format. [7][8]

3.4 Calculation of Velocity of flow and Discharge

3.4.1 Calculation of velocity and discharge by Manning's Formula
The velocity of flow was calculated using Manning's formula as mentioned in the previous chapters.
It was observed that the peak discharge of the channel is 19.886 cumec.[7][8]

3.4.2 Calculation of Velocity and Discharge using Chezy's Formula
The velocity of flow was calculated using Chezy's formula as mentioned in the previous chapters. It was observed that the peak discharge through the channel was 19.309 cumec.[7][8]