

## DETAILED PROJECT REPORT AND ESTIMATED COST

Ministry of Jal Shakti, Department of Water Resources and Ganga Rejuvenation, Govt of India has a nation wide plan to install Automatic Data Acquisition & Real Time Data Transmission System (Telemetry stations) for flood moderation and forecasting activities.

The Scheme "Development of Water Resources Information System (DWRIS)" is a Central Sector Scheme of the Ministry of Jal Shakti, Department of Water Resources, River Development & Ganga Rejuvenation (MOWR, RD & GR), Govt. of India being implemented by Central Water Commission (CWC). The rationale of such an ambitious scheme has coherence with the National Water Policy-2012, which states that "appropriate institutional arrangements for each river basin should be developed to collect and collate all data on regular basis with regard to rainfall, river flows, area irrigated by crops and by source, utilizations for various uses by both surface and ground water and to publish water accounts on ten daily basis every year for each river basin with appropriate water budgets and water accounts based on the hydrologic balances". Under this national scheme, the flood forecasting by Central Water Commission (CWC) has been identified a core activity for flood related disaster management.

Further, CWC is a premier Technical Organization of India in the field of Water Resources and is presently functioning as an attached office of the Ministry of Jal Shakti, Department of Water Resources, RD & GR, Government of India. The Commission is entrusted with the general responsibilities of initiating, coordinating and furthering in consultation of the State Governments concerned, schemes for control, conservation and utilization of water resources throughout the country, for purpose of Flood Control, Irrigation, Navigation, Drinking Water Supply and Water Power Development. It also undertakes the investigations, construction and execution of any such schemes as required.

Presently, Sikkim Investigation Division, CWC, Gangtok is entrusted with the work of flood forecasting activity by installation of Automatic data Acquisition & Real Time Data Transmission System (for water level, rainfall & snow telemetry stations) at 45 locations in the state of Sikkim. Till date 37 nos. of Automatic data Acquisition & Real Time Data Transmission System (for water level & rainfall) are installed and remaining 13 nos. are to be installed for water level, rainfall & snow measurement.

It is to be noted that the system is flexible to shift / relocate within 200-300 m or maximum of 500 m if any flora and fauna is being disturbed. Further, these stations can also be established on any forest office building if available in these areas.

The data which will be collected is to be used in a Model, for studying the flow of river in Himalayan Geology for forecasting of water level at our established flood forecasting sites in the Sikkim state. In addition to the present forecasting methods, this real time data through telemetry will strengthen the food-forecasting network of Sikkim State.

Telemetry is the collection of measurements or other data at remote points and their automatic transmission to receiving equipment for monitoring. In this 21st century, weather monitoring and forecasting have great importance and is used in several areas such as keeping track of agricultural field weather conditions to that of industrial conditions monitoring. Water level monitoring in rivers / tributaries would help in keeping track of flow which will be used in flood forecasting along with Weather monitoring which would help in keeping record of different climatic behaviors which includes precipitation (solid i.e snow or liquid i.e rain), wind, temperature and humidity. Weather Monitoring System can either be wired or wireless one. Just in case of wireless communication, the connectivity will be more user friendly and weather monitoring would not require physical presence of the person at the remote location. There are total 3 types of sensors are to installed to record water level, Rain & Snow :



### 1. Water Level Recorder (Bubbler type or Radar type) :-

- Bubble Type Water Level Recorder is used to measure water level of river. It works on principle in which air is pumped by means of air probe dipped in water, the data is read when bubbling starts and is converted to equivalent water head and automatically records data in attached Data Logger and transfer data to modeling center. A Solar Panel is attached to charge the batteries for Unattended Continuous logging.

Area requirement : Approx. 2m X 2m (6.5 ft X 6.5 ft)

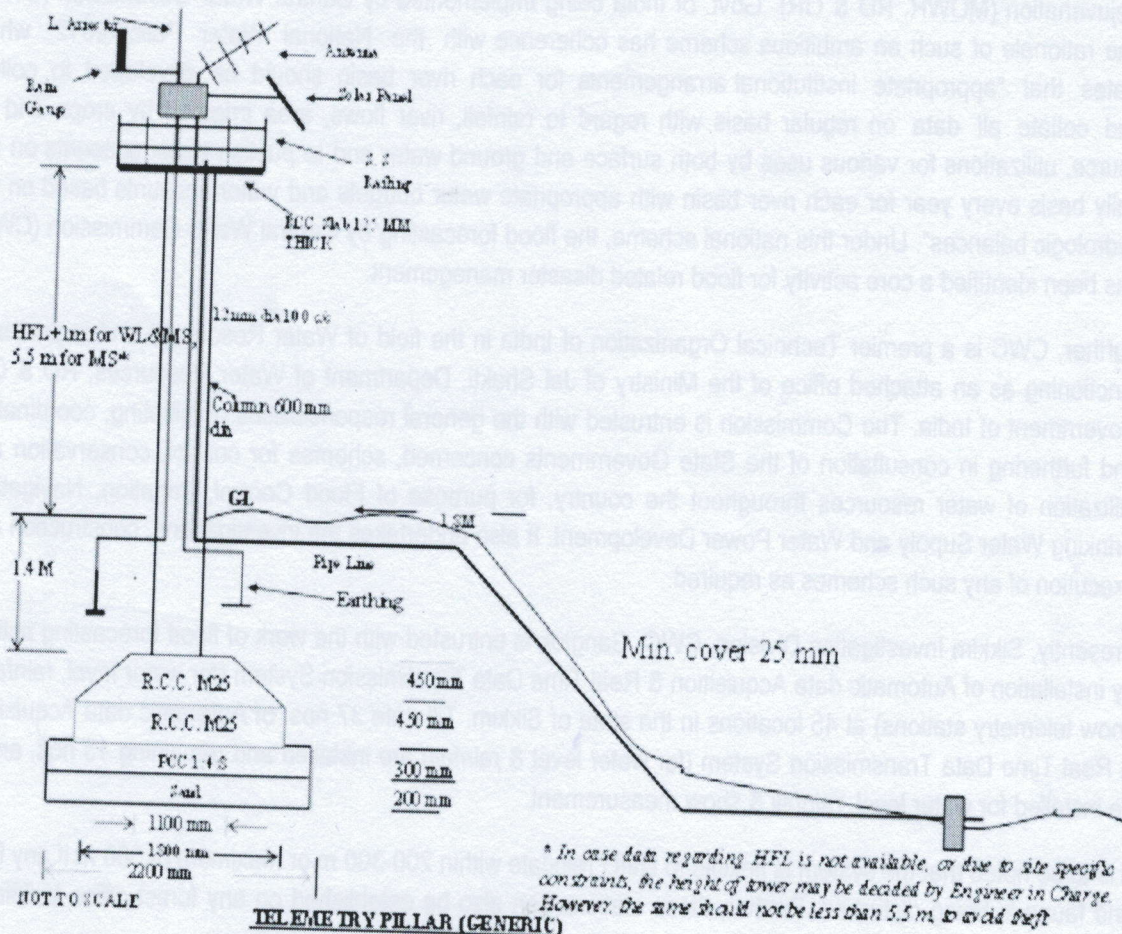


Figure 1 :- Structural details of Bubbler Type Water Level Recorder

- Radar level measurement is used to measure water level of river. It based on the principle of measuring the time required for the microwave pulse and its reflected echo to make a complete return trip between the non-contacting transducer and the senses water level. Then, the transceiver converts this signal electrically into level and presents it as an analogue and/or digital signal. It automatically records data in the attached Data Logger and transfer data to modeling center at Gangtok. A solar panel is used to charge the batteries for Unattended Continuous logging.

Area requirement : None



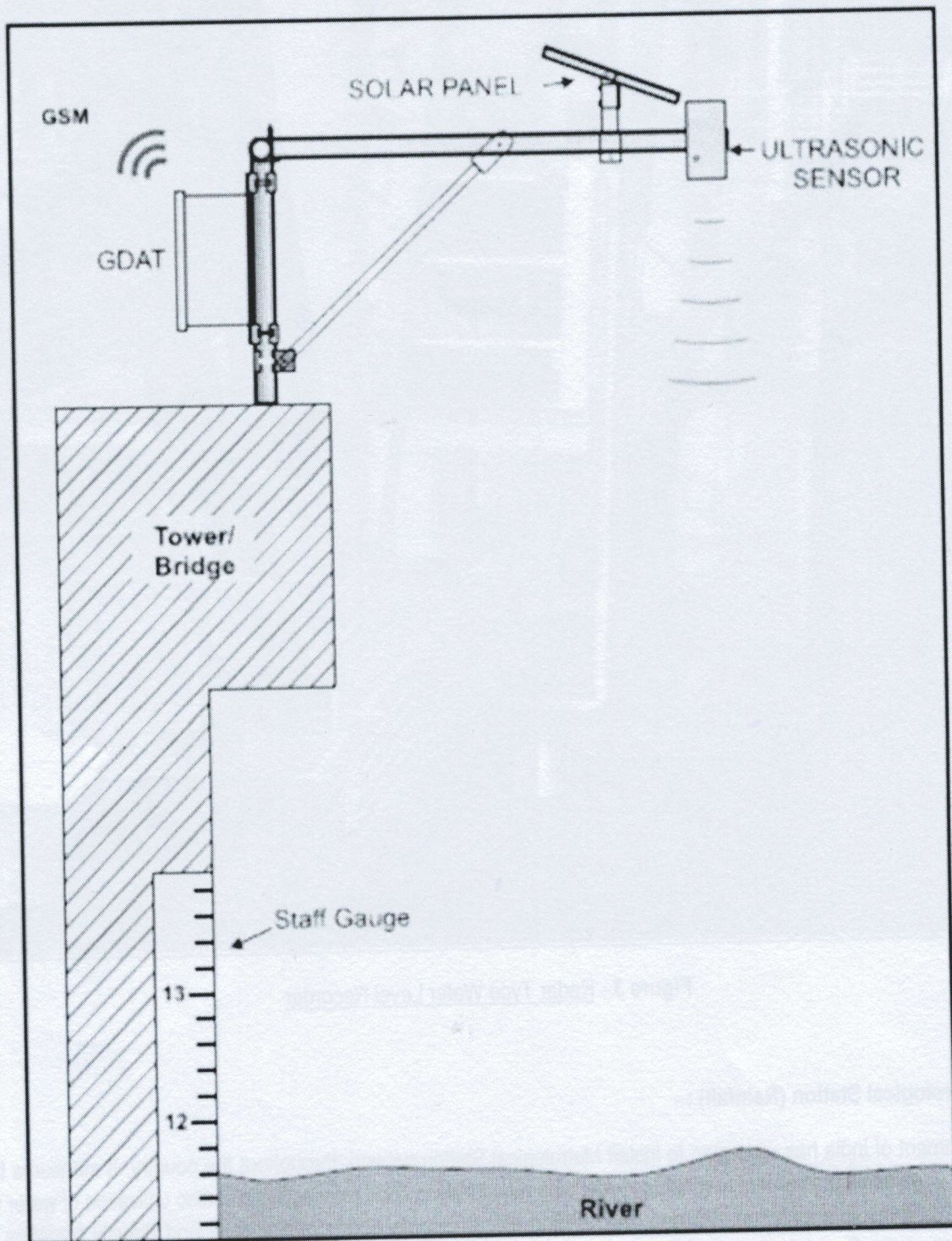


Figure 2:- Radar Type Water Level Recorder



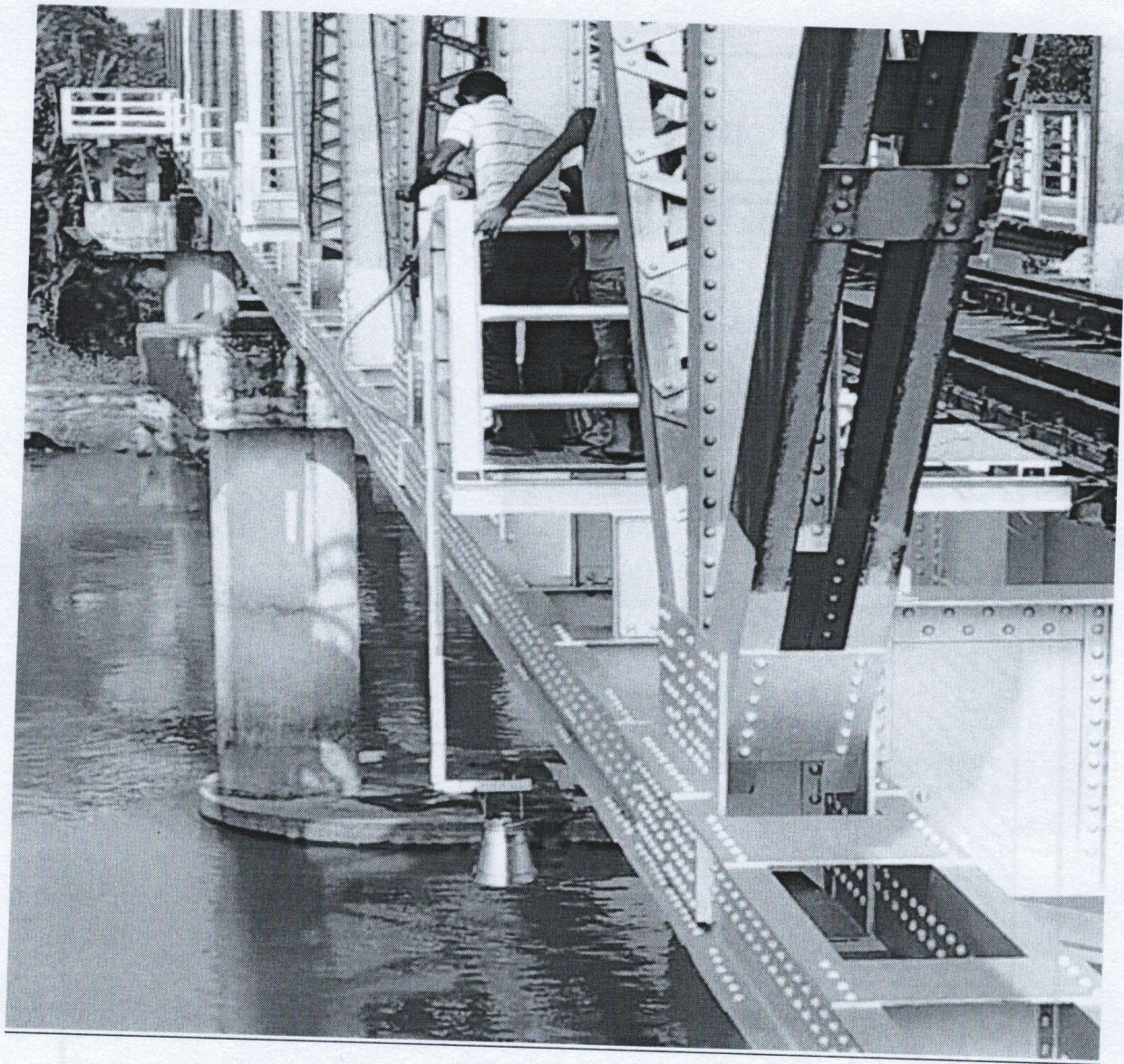


Figure 3:- Radar Type Water Level Recorder

## 2. Metrological Station (Rainfall) : -

Government of India has wide plan to install Metrological Station network throughout the country. It measures the rainfall in particular catchment that helps to real time monitoring in flood forecasting and also utilization of water for various purpose like irrigation, drinking, land sliding etc. It records hourly rainfall data and directly transfers to modeling center Gangtok. Each station covers 2 m X 2 m land in which a instruments setup on the top of a column of size 0.6 m dia. Since Digital rainfall recorder is contained fully automatic data recorder fitted with solar panel and SLA battery-based power system, so there is no requirement of any skilled man power as well as any external source of electricity.

Area requirement: approximately 2m X 2m (6.5 ft X 6.5 ft)



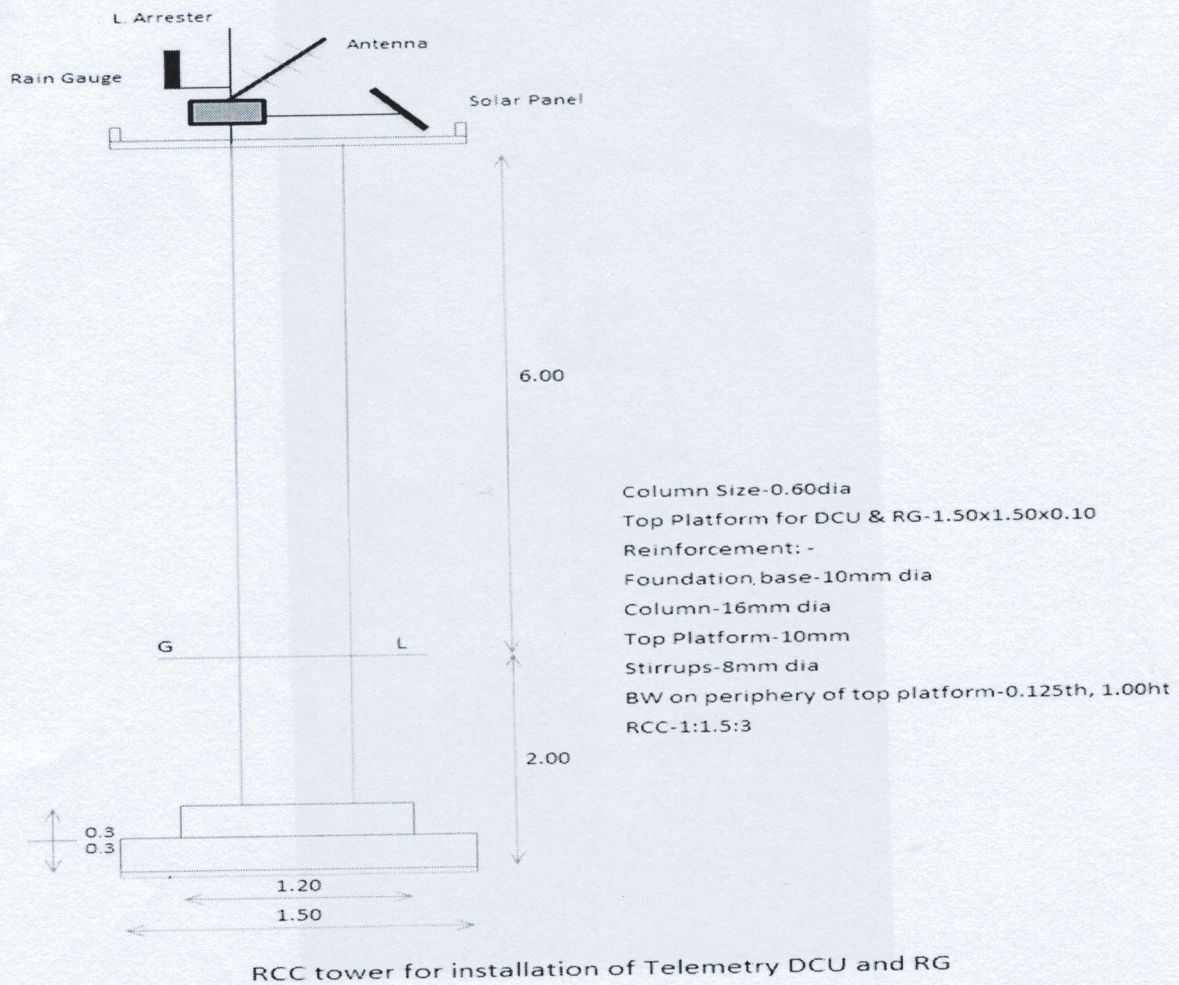


Figure 4:- Structural details of Metrological Station





Figure 5:- Metrological (Rainfall) Station

### 3. Snow Gauge Station:-

A snow gauge is a type of instrument used by meteorologists and hydrologists to gather and measure the amount of solid precipitation (as opposed to liquid precipitation that is measured by a rain gauge) over a set period of time. The snow gauge consists of two parts, a copper catchment container and the funnel shaped gauge itself. The actual gauge is mounted on a pipe outdoors and is approximately 1.5 m (4 ft 11 in) high, while the container is 51.5 cm (4 ft 2.25 in) long. Remote station shall be equipped with all necessary equipment to measure Snow precipitation / rainfall, snow depth, snow density/snow water equivalent and Meteorological parameters consisting of Temperature, Humidity, Evaporation, sunshine and Wind Instruments (AWS), including tubing as well as all Peripherals including the following:

- Data Collection Unit (DCU) mounted inside an enclosure
- Mast (tripod) to mount DCU and solar panel & INSAT antenna at the site (alternatively, where walled enclosures available, the same can be mounted on the wall).
- Civil works for mast and Snow gauge
- Wire-mesh fencing and gate with lock
- Mounting stand for Snow gauge will be mounted at WMO Specification 0.8 to 1m above ground.



Area requirement: approximately 4.5m X 4.5m (15ft X 15ft)

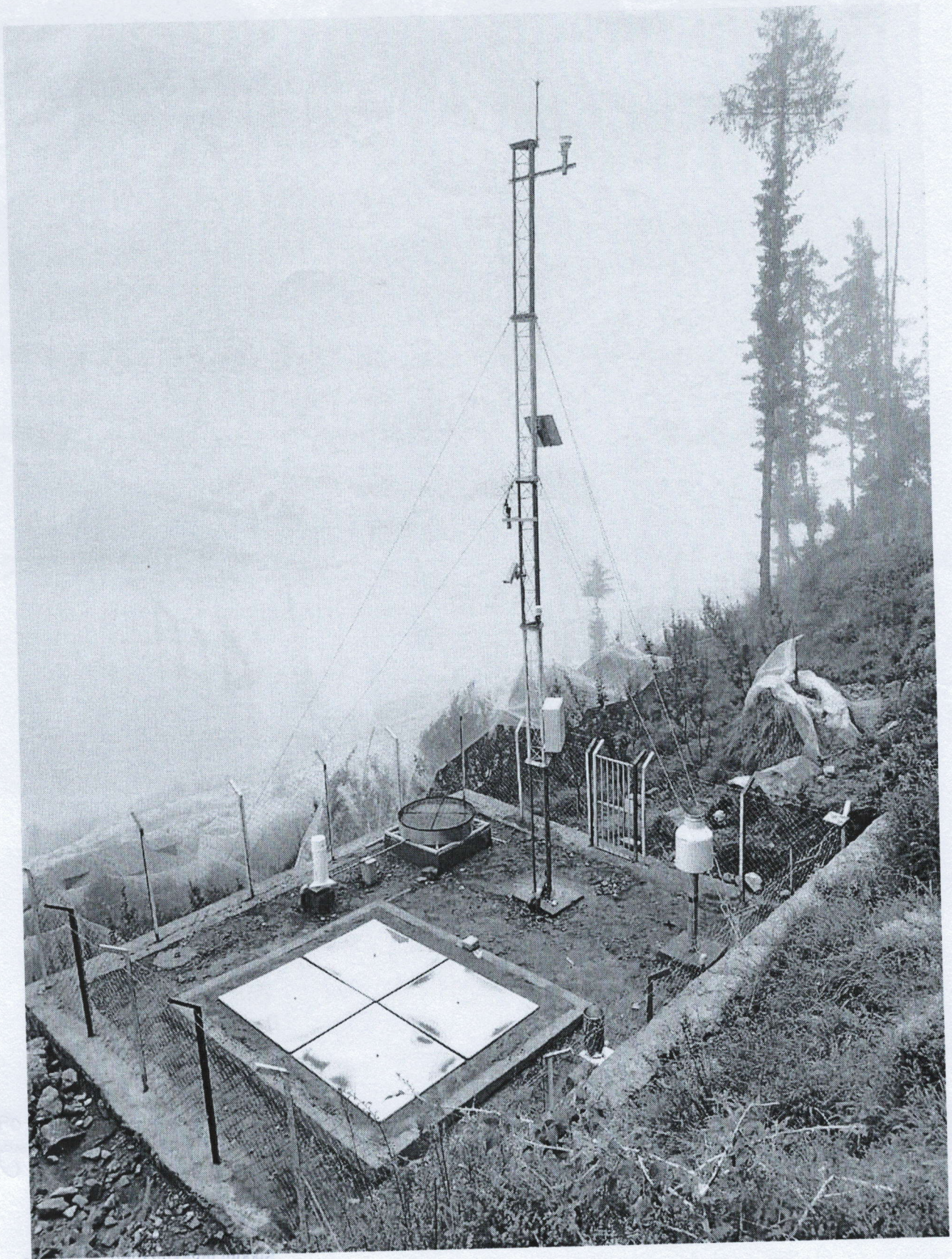


Figure 6:- Snow Gauge Station at CWC site



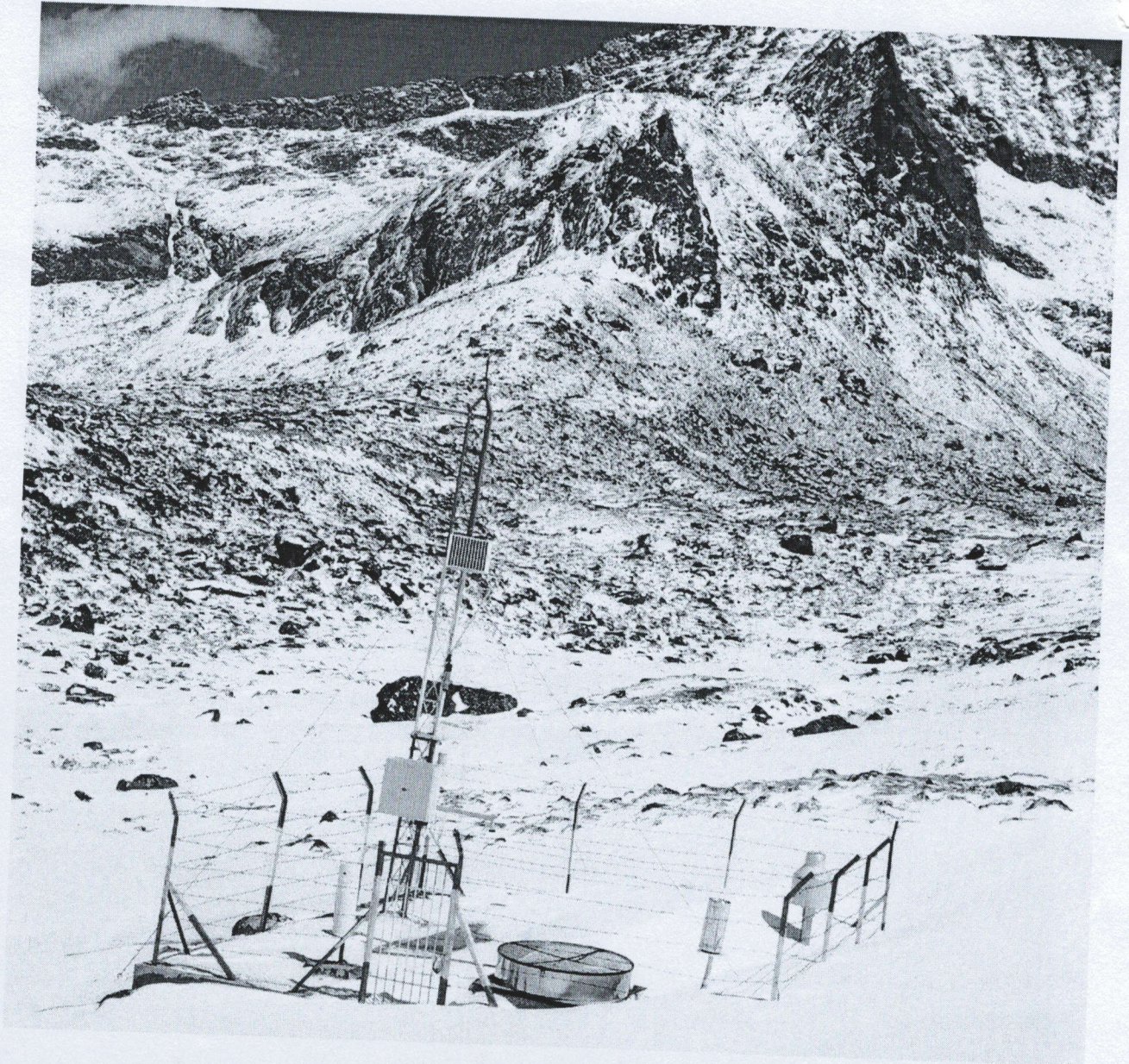


Figure 7:- Snow Gauge Station at CWC site

Estimate: Letter of Intent given to the firm enclosed

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 Place: ..... Gangtok

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