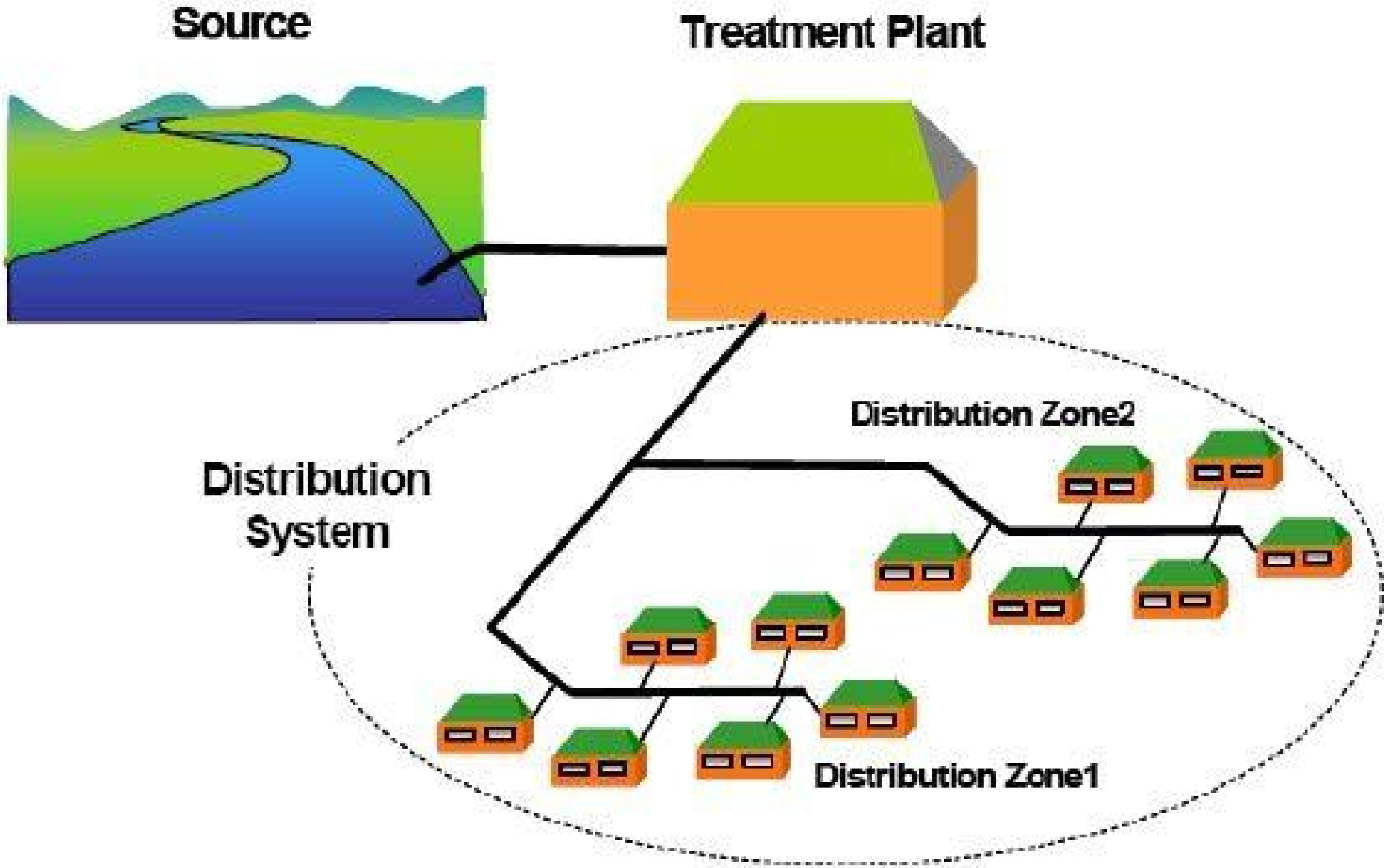
# Environmental Planning of Urban network services Such as Water Supply, Sewerage, Solid waste managenent

# WATER SUPPLY / DISTRIBUTION SYSTEM




**WATER DISTRIBUTION SYSTEM**

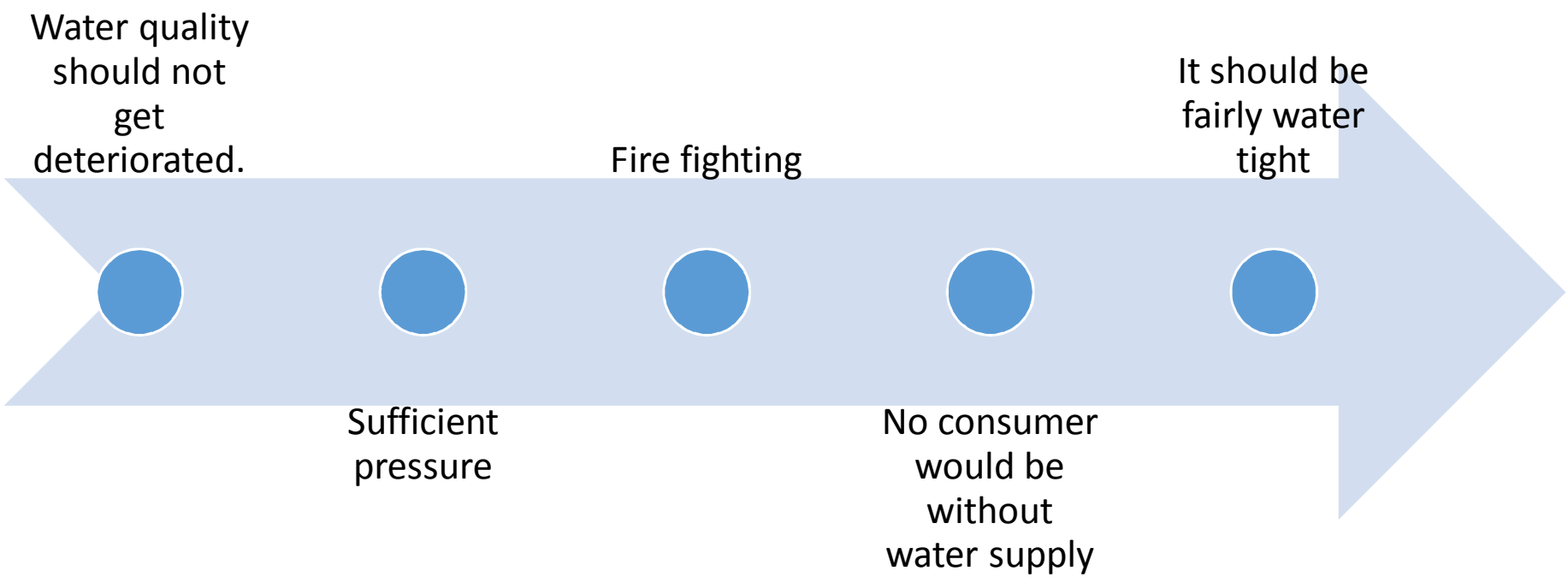
# INTRODUCTION

- The distribution of water means delivering treated water to the user from the source.

- Distribution system is used to describe collectively the facilities used to supply water from its source to the point of usage.

- The purpose of distribution system is to deliver water to consumer with appropriate quality, quantity & pressure.

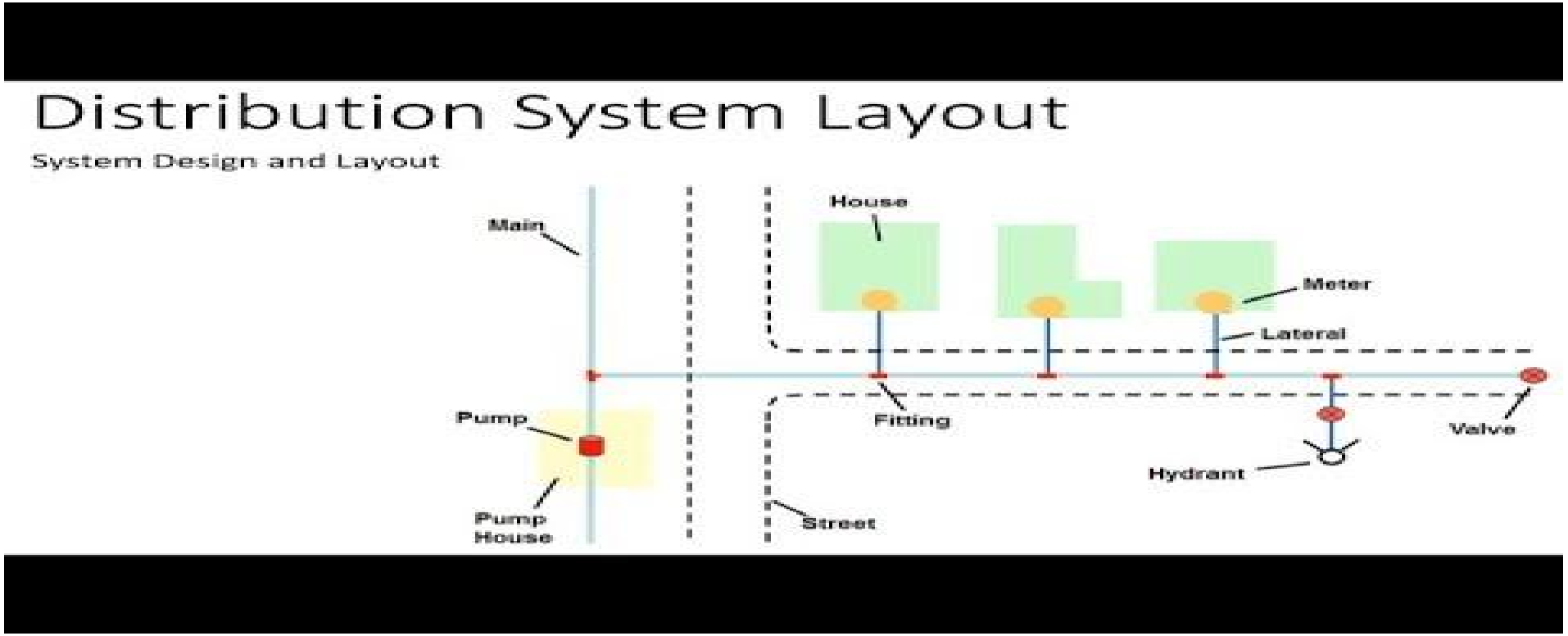
# REQUIREMENTS OF GOOD DISTRIBUTION SYSTEM



# LAYOUTS OF DISTRIBUTION NETWORK

- The distribution pipes are generally laid below the road pavements.

- Pipes are always laid 1m above or away the sewer line



# CLASSIFICATION OF NETWORK

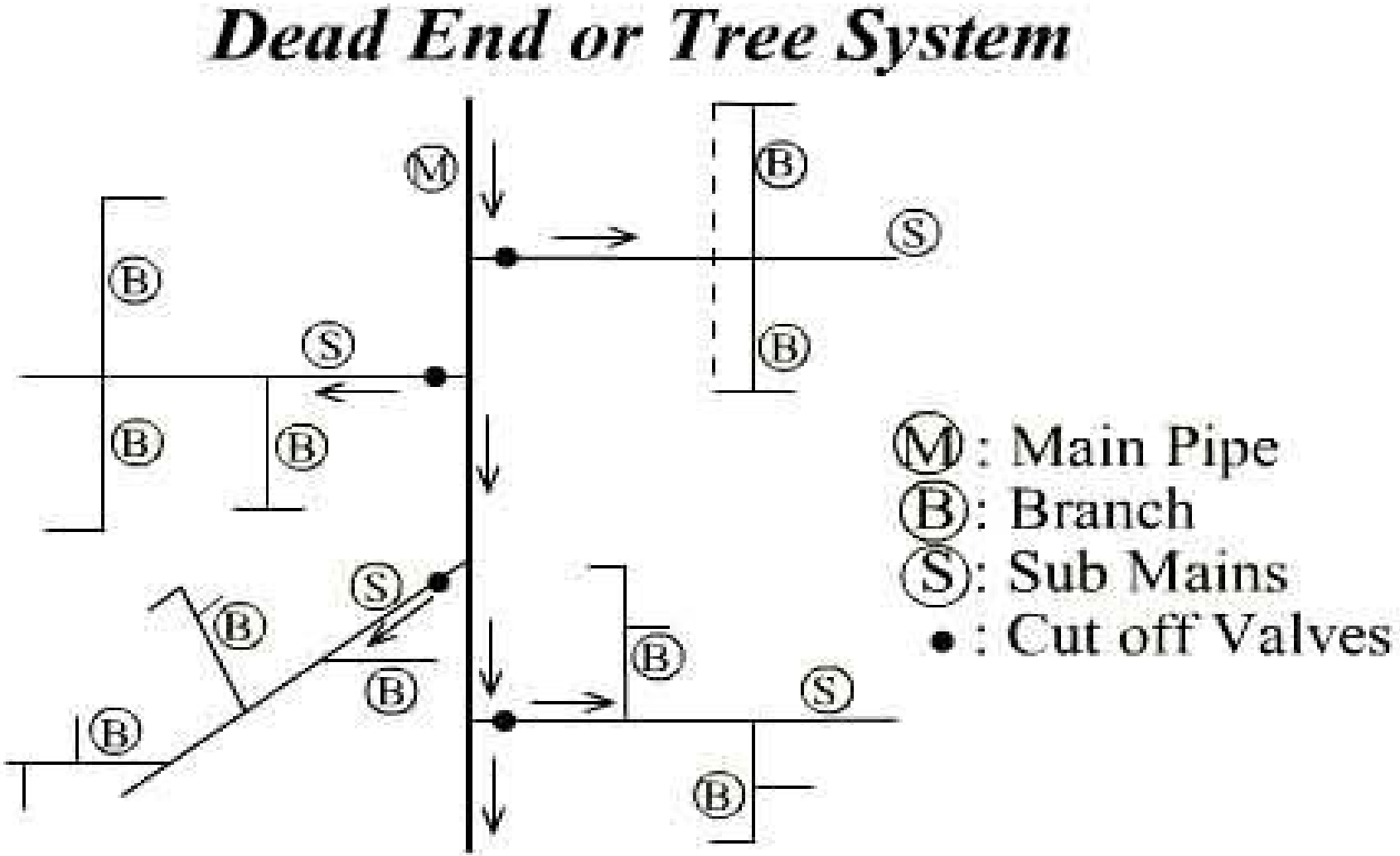
1. Dead end system
2. Radial system
3. Grid system
4. Ring system

# CLASSIFICATION OF NETWORK

## 1.Dead end system

1. Dead end system, the name itself defining that it contains dead ends in the pipe system.
2. water does not flow continuously in the dead end system. In this system the whole pipe network is divided into several sub networks.
3. Those are namely main line, sub mains, branch lines and service connections.
4. It is suitable for old towns and cities having no definite pattern of roads.

# CLASSIFICATION OF NETWORK



# 1.Dead end system

## ADVANTAGE :-

1. Pipes in this network can be laid easily.
2. The pressure and discharge in each pipe can be determined very easily and accurately which makes design calculations very simple.
3. Dead end system requires less number of cut off valves.

## DISAVANTAGES

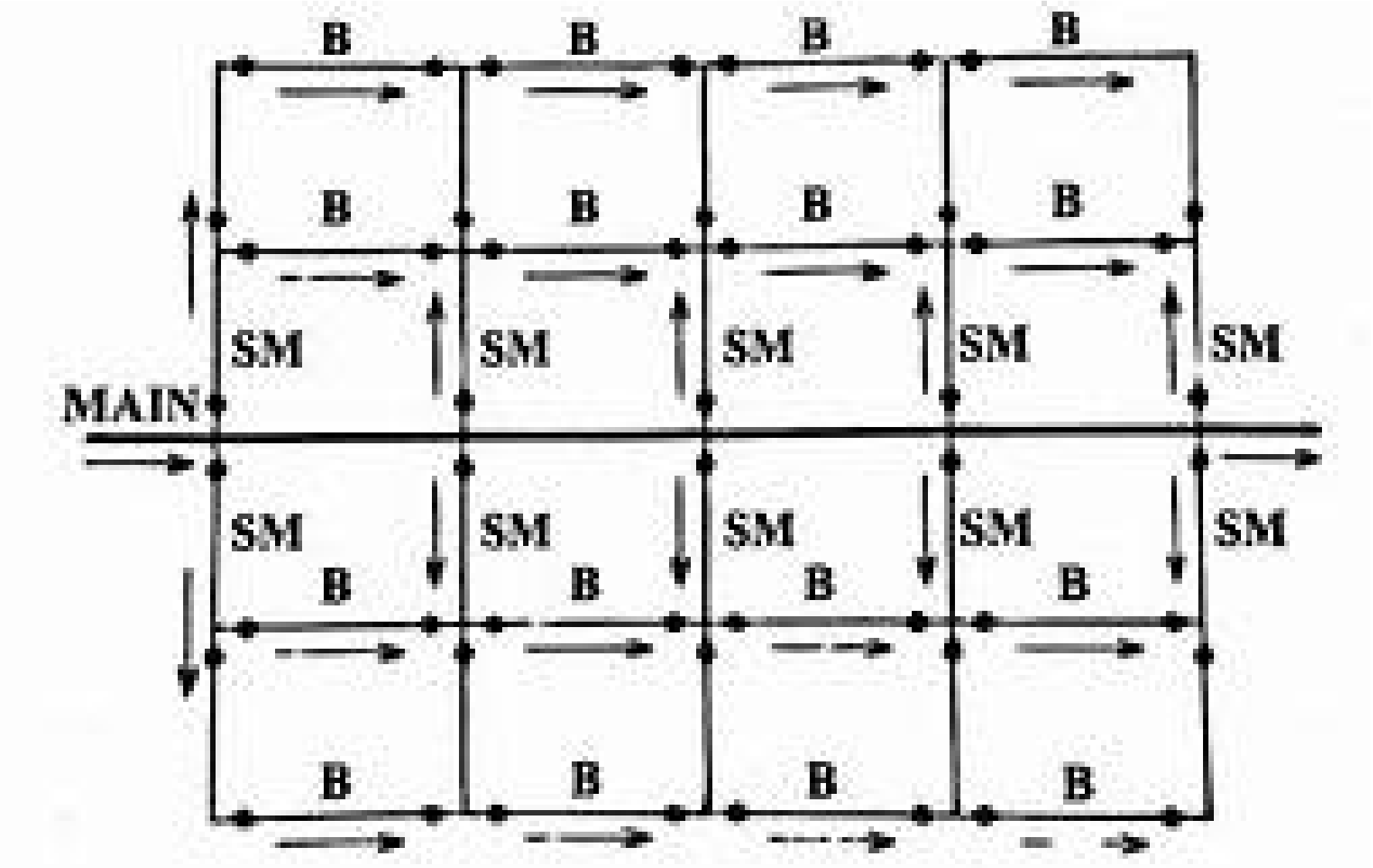
1. The pressure is not constant and is very less at remote parts.
2. If there is any damage occurs in the branch line, the whole portion should be stopped to repair that which creates discomfort to the other users in that sub main line.
3. In this system, Limited discharge is available for firefighting.

# CLASSIFICATION OF NETWORK

## 2.Grid iron system

1. Grid iron system also contains main lines, sub mains and branch lines. But in this system dead ends are eliminated by interconnecting all the lines.
2. The water flow continuously in this system without stagnating.
3. This system is also called as interlaced system or reticulation system. It is more suitable for well-planned cities.

# 2.Grid iron system



# 2.Grid iron system

## ADVANTAGE :-

1. Water will flow continuously without any dead ends or sediment deposits.
2. Head loss is minimum in this case because of interconnection of pipes.
3. The discharge will meet the required discharge for firefighting.
4. Repair works can be easily done just by closing cutoff valve in that line which do not affect the other users

## DISAVANTAGES

1. Because of circulating flow from all directions, the pipes used in this system should be of large diameters and longer lengths.
2. We cannot determine the accurate discharge, velocity or pressure in a particular pipe. So, design is difficult.
3. Laying of pipes will be done by skilled workers which consume more cost.
4. Cutoff valves required should be more in this system.

# CLASSIFICATION OF NETWORK

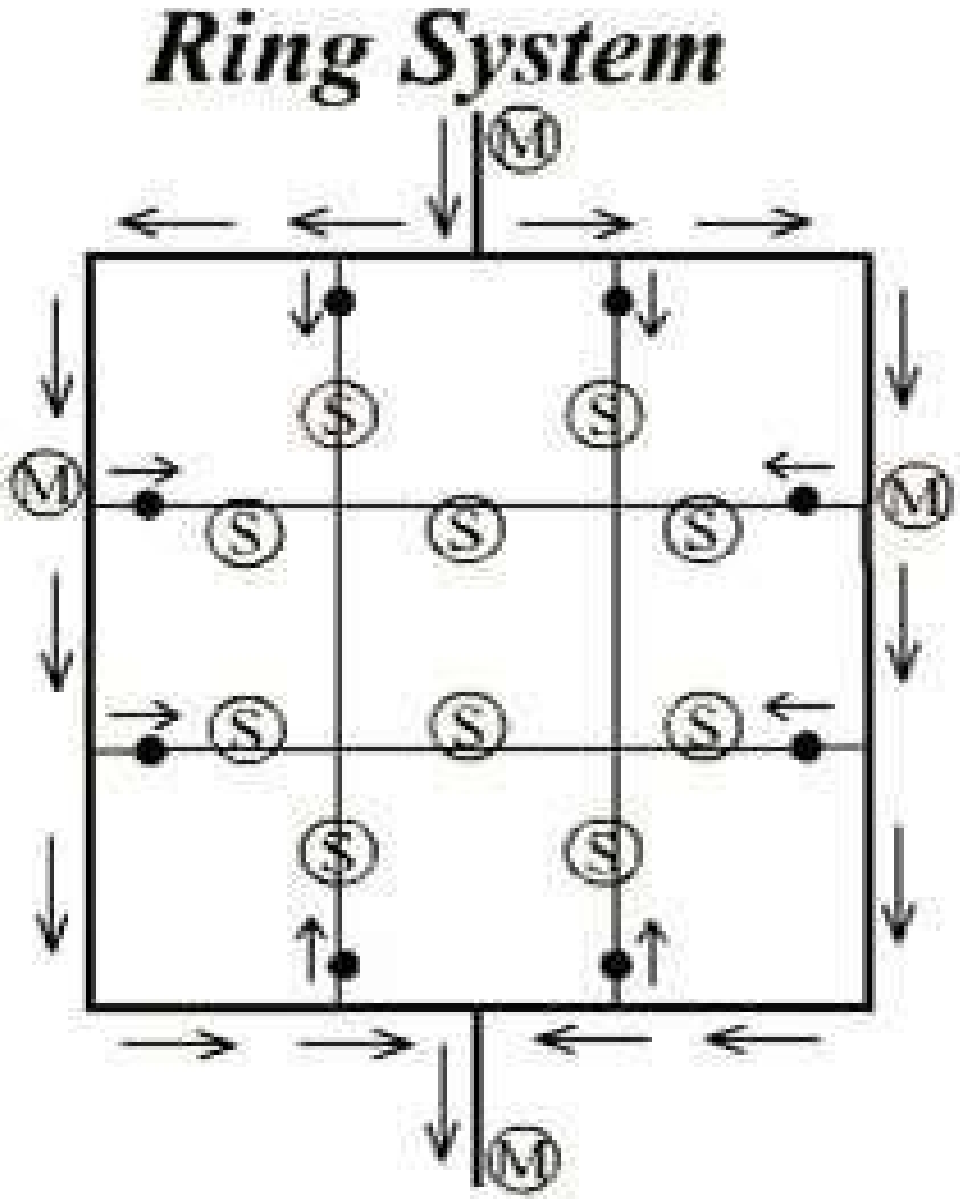
## 3. Ring system

1. Ring system, can also be called as circular system in which the main pipe line is provided around the city or area i.e., peripherally.

2. From this main line, the branch lines are projected perpendicularly and they are also connected with each other.

1. So, every street of the distributed area will get sufficient quantity of water. For a town with well-planned streets and roads, Circular system is more suitable

# RING SYSTEM



# 3.Ring System

## ADVANTAGE :-

1. No stagnation of water
2. Repair works can be done without affecting larger network.
3. Large quantity of water is available for firefighting.

## DISAVANTAGES:-

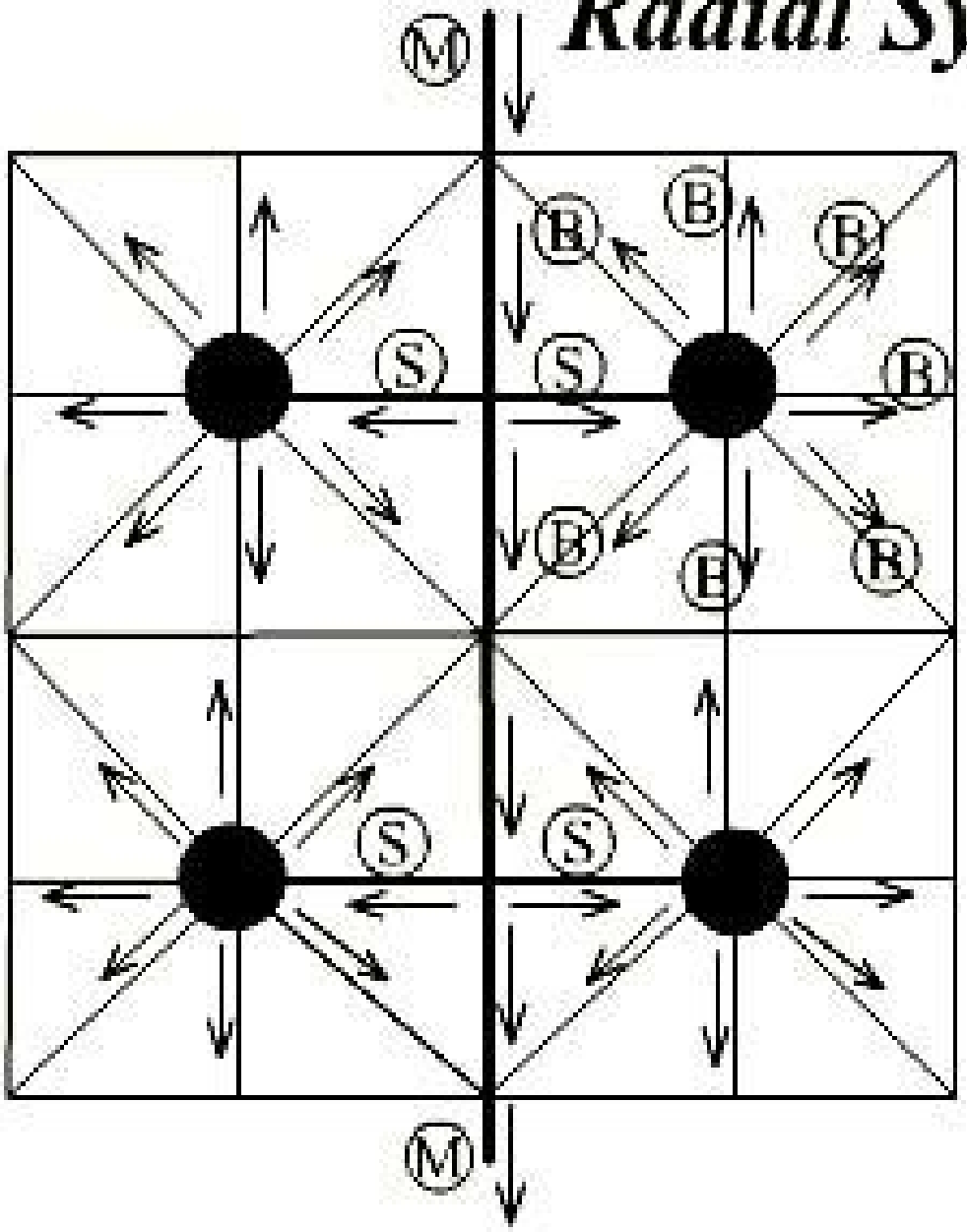
1. Longer length and large diameter pipes are required.
2. More number of cutoff valves are necessary.
3. Skilled workers are necessary while laying pipe

# CLASSIFICATION OF NETWORK

## 4. Radial system

1. Radial system is quite opposite to the ring system.
2. whole area is divided into small distribution districts or zones and an individual distribution reservoir is provided for each distribution zone.
3. The reservoir provided is generally of elevated type.
4. From this reservoir the pipe lines are laid radially to the surrounded streets.
5. All distribution reservoirs are connected with main line which is passing through center of the city.
6. This type of system is suitable for areas with radially designed roads

# *Radial System*




● : Distribution Reservoirs

# 4.Radial System

## ADVANTAGE :-

1. The water distributed with high velocity and high pressure.
2. Head loss is very small because of quick discharge.

## DISAVANTAGES:-

1. Cost of the project is more because of number of individual distribution reservoirs

# METHODS OF WATER DISTRIBUTION SYSTEM

1. For efficient distribution system adequate water pressure required at various points.

2. Depending upon the level of source, topography of the area and other local conditions, the water may be forced into distribution system by following ways:-

**1.Gravity system**

**2.Pumping system**

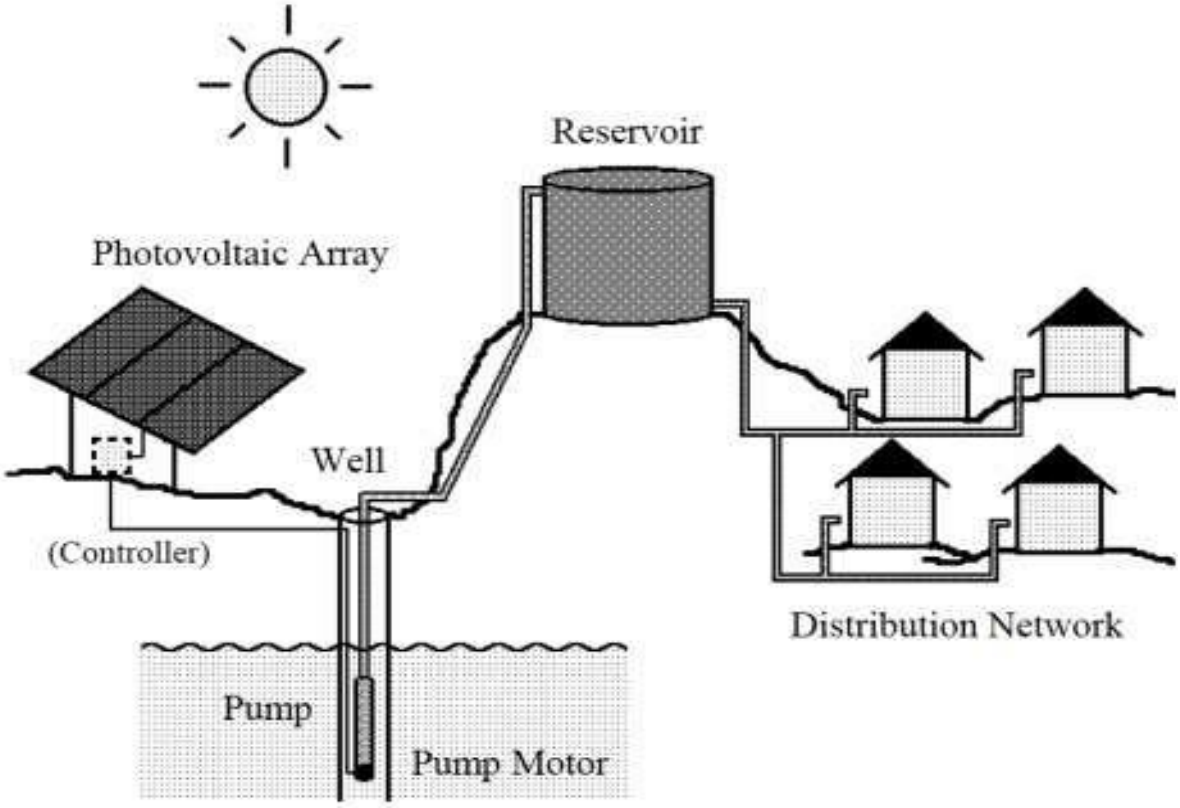
**3.Combined gravity and pumping system**

# 1. GRAVITY SYSTEM

1. Suitable when source of supply is at sufficient height.
2. Most reliable and economical distribution system.
3. The water head available at the consumer is just minimum required.
4. The remaining head is consumed in the frictional and other losses.

# PUMPING SYSTEM

Source → Pump → Elevated area

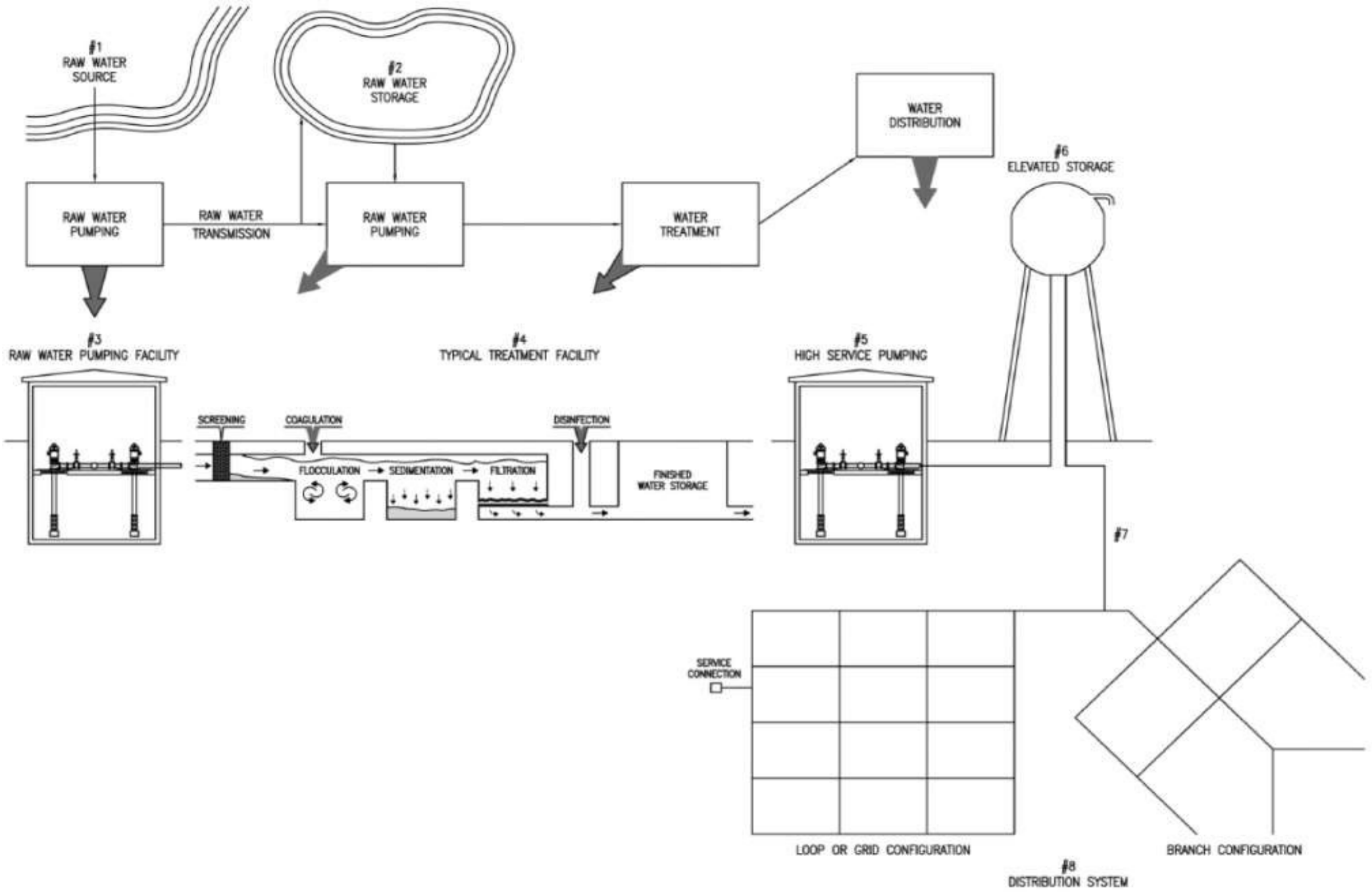


# PUMPING SYSTEM

1. Treated water is directly into the distribution main out storing.
2. Also called pumping without storage system.
3. High lifts pumps are required.
4. If power supply fails, complete stoppage of water supply.
5. The method is not general used.

# COMBINED GRAVITY and PUMPING SYSTEM

1. Most common system
2. Treated water is pumped and stored in an elevated distribution reservoir.
3. Then supplies to consumer by action of gravity.
4. The excess water during low demand periods get stored in reservoir and get supplied during highdemand period.
5. Economical, efficient and reliable system.




# COMBINED GRAVITY and PUMPING SYSTEM

# Types of tanks

- RCC Tank

- G I Tank

- HDPE Tank

# TYPES of TANKS

1. **R.C.C. Tanks**
2. **G.I. Tanks**
3. **H.D.P.E Tanks (High Density Polyethylene)**

## 1. R.C.C. TANKS:-

- It is of reinforced concrete cement.
- They have long life.
- Very little maintenance.
- Decent appearance.

# 2. G.I. TANKS:-

- It is galvanized iron.
- Generally square or rectangular in shape
- Life of tank is short
- Corrosion of metal occurs
- Maintenance cost is high

# 3.H.D.P.E TANK(High Density Poly Ethylene):-

- It is very popular for storing less quantity of water and hence useful for residential purpose.
- Handling is easy because of light weight.
- Cheap in cost
- Maintenance cost is low.
- Cleaning of tanks are easy.

# TYPES OF JOINTS

- End cap joint
- Tee joint
- Reducer joint
- Bent joint
- Collar joint

(Reducer joint when ends differ in size)

Thank you