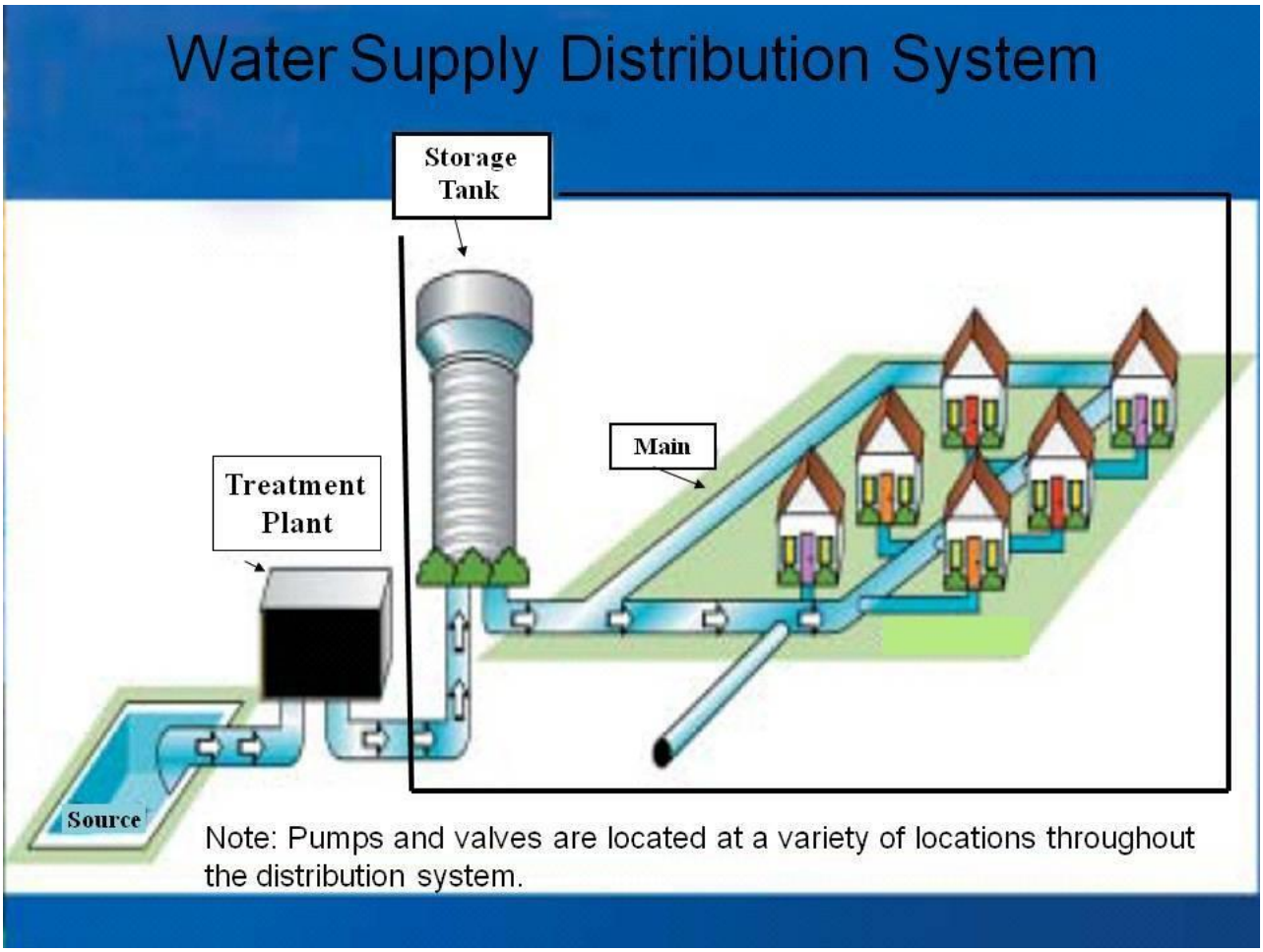
Drinking Water Supply System

Water distribution systems consist of an interconnected series of components. They include:

•pipes
•storage facilities
•components that convey drinking water



Water distribution systems meet fire protection needs for:

•cities
•homes
•schools
•hospitals
•businesses
•industries
•other facilities

Public water systems depend on distribution systems to provide an uninterrupted supply of pressurized safe drinking water to all consumers. Distribution system mains carry water from either:

•the treatment plant to the consumer; or
•the source to the consumer when treatment is absent.

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Water quality and the distribution system

New pipes are added to distribution systems as development occurs. The additions result in a wide variation in:

•Pipe sizes
•Materials
•Methods of construction
•Age within individual distribution systems and across the nation

As these systems age, deterioration can occur due to corrosion, materials erosion, and external pressures. Deteriorating water distribution systems can lead to:

•Breaches in pipes and storage facilities
•Intrusion due to water pressure fluctuation
•Main breaks

1. The source of supply

The raw water source for a public water system must have enough water to satisfy both urban, institutional, and industrial needs, as well as fire-fighting demand. The most common kinds of water are sourced either from the surface or the ground.

While a single stream provides most water supplies, there are times when both surface water and groundwater are used. Wide rivers or dams are used to provide surface water; a small stream can even be ideal if it is dammed. Groundwater is typically collected by drilling wells under the water table into the saturated region.

2. The processing or treatment of the water

Surface water quality may vary since this type of water may contain microorganisms that may or may not include organic or inorganic particles and contain dissolved solids. Typically surface water may look, taste, and smell undesirable because it may be contaminated with sewage, industrial waste, agricultural runoff, and animal waste.

Conversely, groundwater, although also contaminated because of human activity, is way more clear, lacks color, and has lower concentrations of microbes than its counterpart due to the natural filtration system developed by the earth from the soil, sand, or gravel.

Groundwater is better suitable for use in a public water supply – it may only need adequate disinfection to ensure that it is safe for consumption which would depend on the type of contamination present. However, for surface water to become acceptable, it may need a more comprehensive treatment as opposed to ground waters.

Raw water treatment may be performed through the following processes: coagulation, sedimentation, filtration, softening, and removal of iron plus disinfection.

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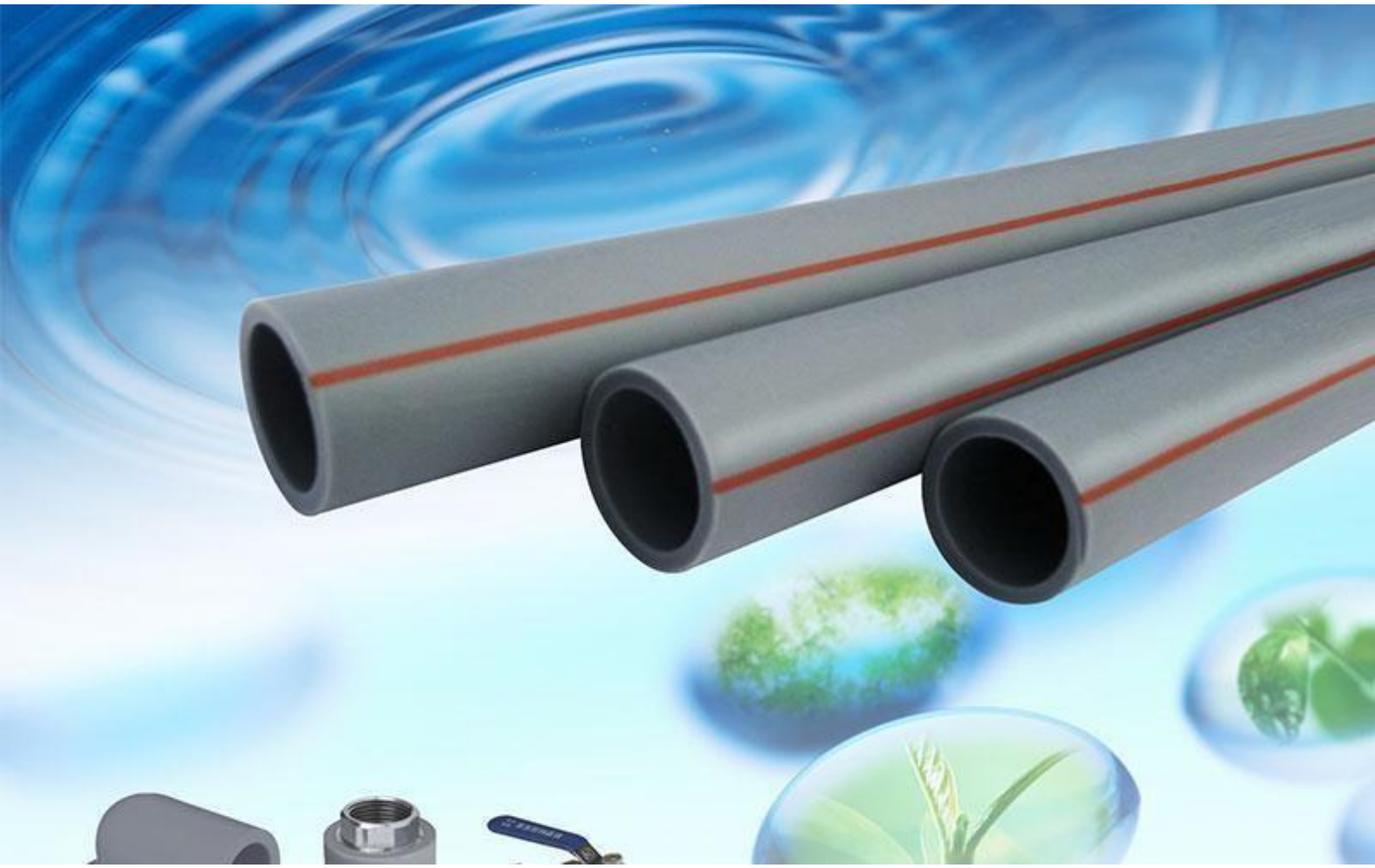
3. The distribution of water to consumers

The distribution system is responsible for the transportation of water from the treatment plant to the would-be consumers. This system is highly complex and demands a sound system design to avoid costly problems in the future; water quality may be hampered or improved depending on the physical structure, construction, and operation of this valuable component of the public water supply.



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