Surface Water Situation

- Ground water and surface water are dependent on each other
- GW flows into the SW sources in the dry season
- SW enters into ground during the monsoon
- Two are interrelated and the use of one usually affects the availability of water from the other.
- Large-scale use of GW for irrigation purposes has caused a lowering of the GW level and drying up of SW sources.
- Surface waters are polluted by agricultural, industrial, domestic and municipal sources
- The use of SW for drinking purposes requires clarification and disinfection by elaborate and extensive treatment processes.
Surface Water Collection System

• A set of Engineering works designed to convey water from a source to a distribution system via a treatment plant

• Includes intakes, suction pipes, delivery pipes and pumping stations
Intakes

- A device placed in a surface water source to permit the withdrawal of water from the source and then discharge it into intake pipe through which it will flow into the water-works system.
Intakes

Two types

• River intakes
• Lake and reservoir intakes
River Intakes

- Constructed well upstream from points of discharge of sewage and industrial waste.
- Preferable locations will have deep water, a stable bottom and favorable water quality.
- Locations will have protection against floods, debris and river traffic.
- For fluctuating river beds, intake pumps are mounted on carriages to move.
Lake and Reservoir Intakes

- Sited with due reference to sources of pollution, prevailing winds and surface currents.
- Reservoir intakes lie closer to the bank in the deepest part of the reservoir; often incorporated into the impounding structure itself.
Intake Velocities and Depths

• Entrance should lie 10 to 15 ft below water surface but 4 to 6 ft above the river, lake or reservoir floor
• Velocities at or below 3 or 4 inch per sec
• Gratings or screens of 2 to 8 mesh to an inch are provided at entrance
Intake Pipe and Pumping Station

- Intakes are connected by pipe lines or by tunnels.
- Intake pipes are designed to operate at self-cleansing velocities, 3 to 4 fps at gravitational flow or suction flow.
- Pump wells are often quite deep depending on the elevation of water level in times of drought.
Intake Design Considerations

- Selection of a particular type for the given source
- The magnitude of the external forces to be resisted by the intake
- Consideration of the total lift from the source to the treatment plant and selection of a suitable pumping unit
- Determination of the total length of suction and delivery mains, head losses due to friction and small bends, enlargement and reduction
Intake Design Considerations

- Selection of suitable screen to provide around the intake pipe not to permit entry of large and small objects, such as logs, stones, aquatic lives and vegetation.
- Installation of intake valves or port holes at 2 or 3 different levels to get the best available quality of water, eliminating seasonal fluctuation of water levels.
- Determination of cost-benefit ratio.
- Assurance of the safety of the intake structure, provision for future extension and installation of standby units of pumps.
Sharulia Intake Station, SWTP, Dhaka

WASA

Bar screens on the outside
Sharulia Intake Station, SWTP, Dhaka

River Training Works to protect the banks beside the intake

Additional screens before pumping
Sharulia Intake Station, SWTP, Dhaka

WASA
Sluice Gates to Control the flow

Inside the pump house
Sharulia Intake Station, SWTP, Dhaka

WASA

Water is pumped and discharged to WASA Conveyance Canal

WASA Conveyance Canal