

Plumbing & Drainage: Concerns of Building Owner

Welcome

Syed Azizul Haq, PEng
M.Engg.(Env.)

Executive Engineer
Public Works Department (PWD)

Faculty, Part Time
American International University,
Bangladesh, (AIUB)

Housing and Building Research Institute,
Dar-us-Salam, Mirpur, Dhaka

27, August, 2008

Introduction

Definition: Plumbing is the art and science of designing, installing and maintaining of pipes, fixtures, equipment and its accessories for controlled flow of fluids (water, gas and water conveying waste) required in a building

Scope of plumbing works:

A. Water supply:

1. Supply of water at various range of temperature i. Water at normal temperature, ii.. Hot water temperature varies from 40 C to 80 C and iii. Chilled water.
2. Fire fighting by jetting water on fire. I. Dry riser system, li. Wet riser system
3. Recreational purpose e.g. for swimming pools, fountains, water falls etc.

B. Waste disposal from buildings. Conveying human excreta wastes by flushing water and flowing wastewater sanitarily through pipes to safe disposal point.

C. Rainwater management: Utilizing maximum rainwater for human consumption and other purposes and disposing of the rest

D. Gas supply: For using as fuel and live saving gas supply in hospitals, clinics etc.

Plumbing Working Team

Plumbing works are accomplished by four categories of working personnel.

01. **Plumbing Engineer**: A professional having minimum academic qualification of Bachelor of Science in Civil or Mechanical engineering or Bachelor of Architecture having proficiency in Plumbing works. Plumbing engineers work in two fields . 1. Consulting and 2. Construction.

02. **Plumbing Contractor**: Persons having valid license of doing plumbing works.

03. **Plumber**: Skilled workers doing plumbing works.

04. **Labour**: Workers assisting plumbers.

Owners Role

Owner plays important role in enjoying good plumbing and drainage system.

01. Owner shall be committed to developing good plumbing and a drainage system.
02. Owner shall engage competent consultant or professionals, contractors and skilled plumbers.
03. Owner shall not influence to deviate from codal practices and local bylaws.
04. Owner shall run maintenance program.
05. Owner shall manage sufficient fund.

Owners Participation

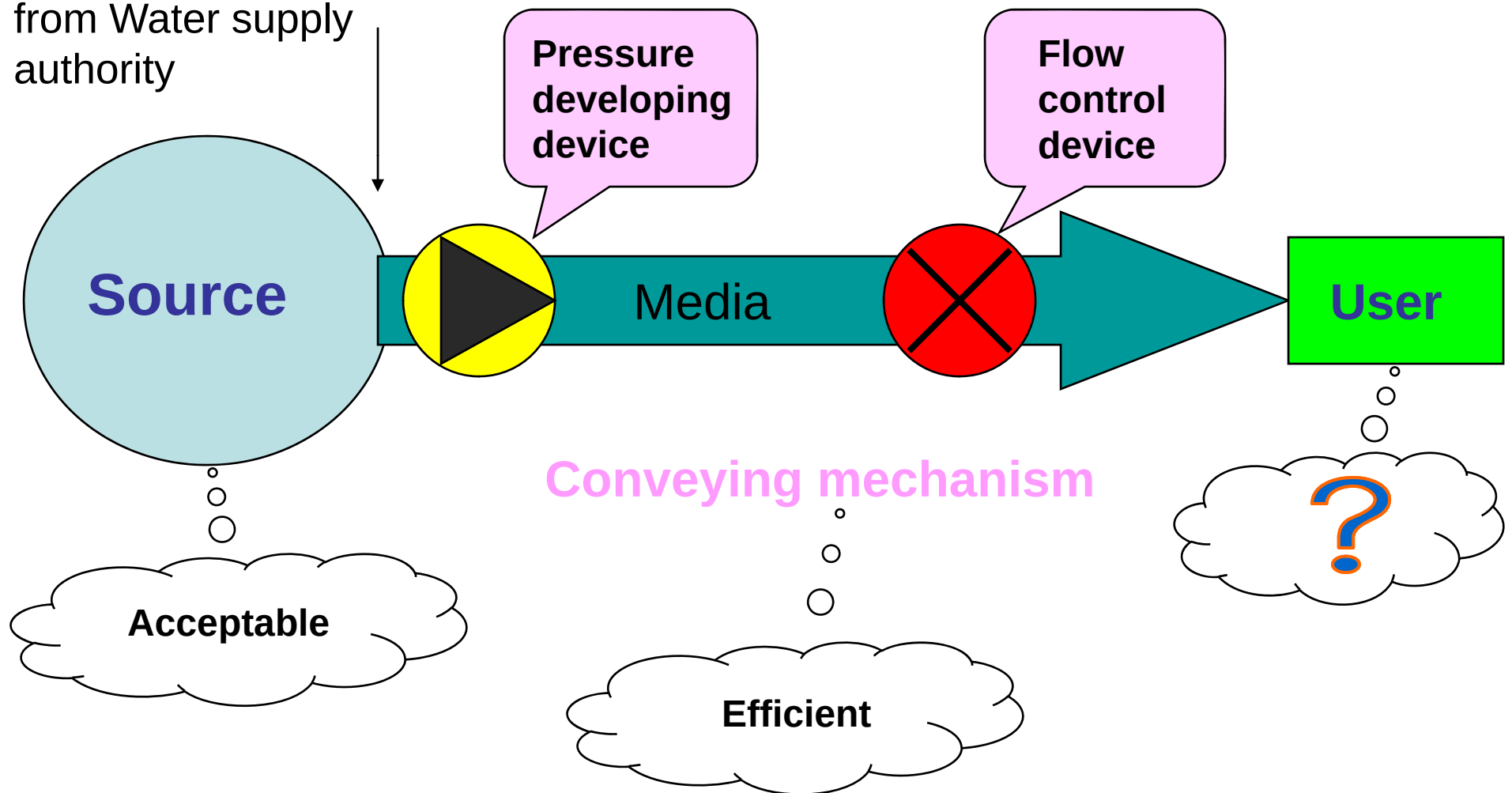
Owner shall play active participation in some of the activities in the process of plumbing activities. Following s are those activities.

01. Owner shall be very capable in selecting plumbing consultant.
02. Owner shall be very judicious in formulating the scope of work of the consultant..
03. Owner shall be very careful, knowledgeable and confident in shouldering some of the responsibilities and activities.

Water Supply

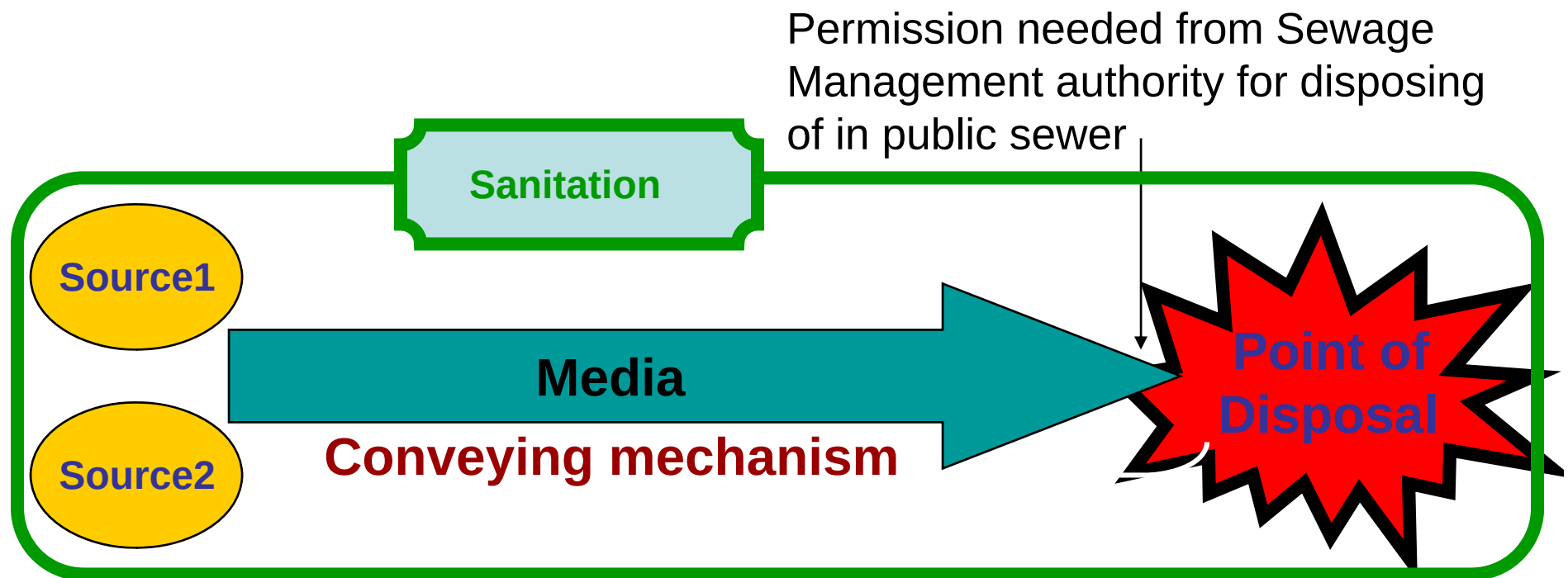
Water supply system in a building comprises of various mechanisms to convey desired amount and quality of water from suitable source to points having demand for.

Permission needed
from Water supply
authority

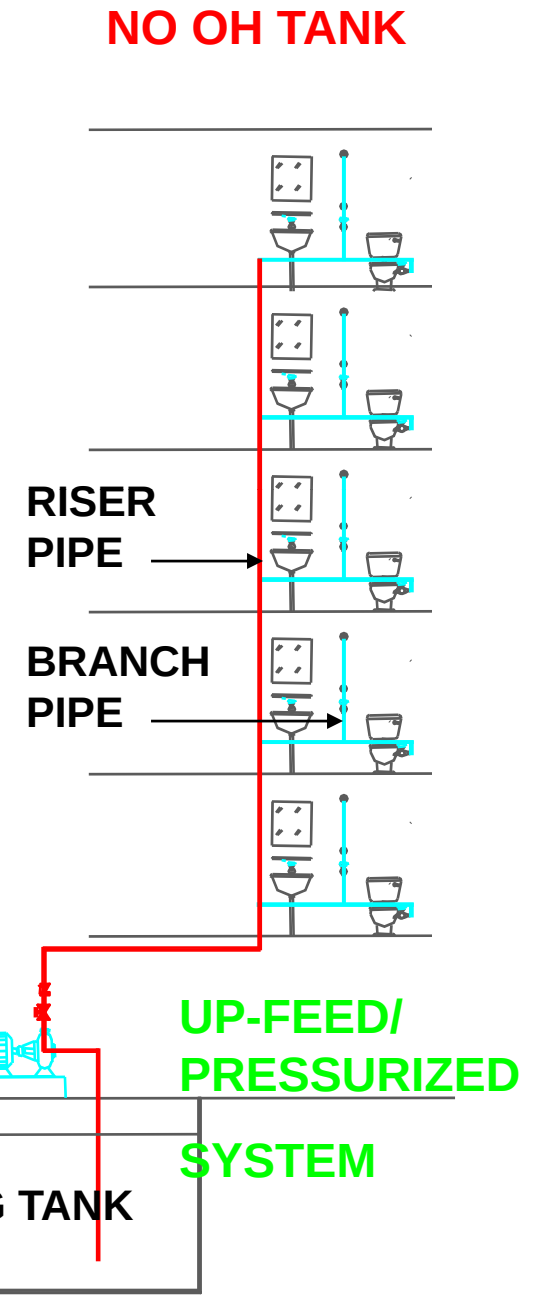
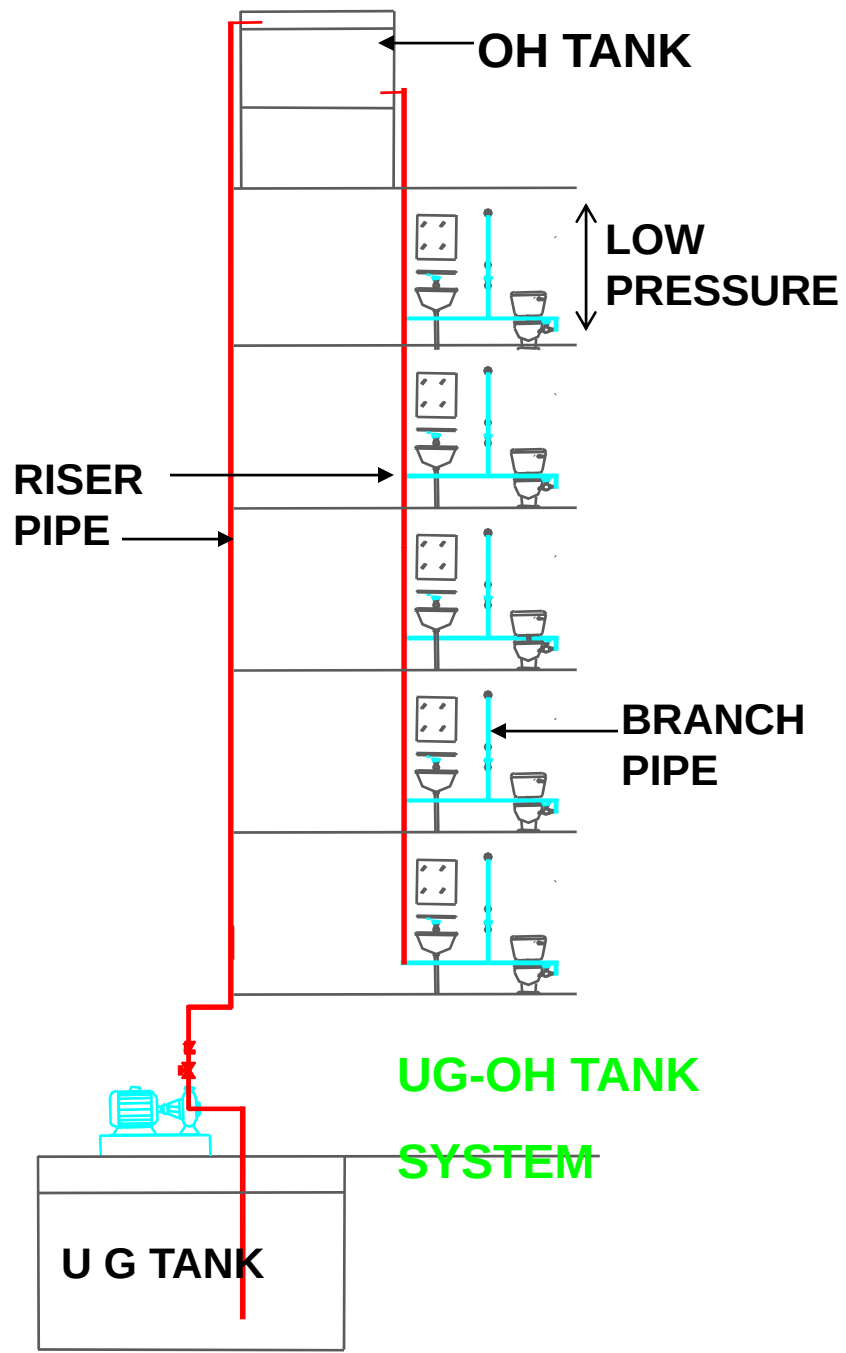


Waste Disposal

Waste disposal from building is accomplished by conveying wastes mostly under gravitational flow, through pipes or drains, using water as media, to a safe disposal point.



Various Water Supply System in Building



UG-OH Tank Water Supply System.

Advantages	Disadvantages
System is simple. System is economic. Pressure fluctuation is small. Water supply is not interrupted following power outage.	Roof top tank may be an unsightly element, creating hindrance for various use of roof area and extra load on structure, source of water contamination. Pressure at upper level floors will be inadequate.

Pressurized Up-feed Water Supply System.

Advantages	Disadvantages
Requires less floor space. Lower initial cost. Flexible system in terms of pressure and flow. No extra load on structure.	Higher maintenance and operating cost, Sophisticated control and skilled operating personnel required, Water supply is interrupted following power failure. Instantaneous pressure fluctuation may be greater.

Water Reservoirs

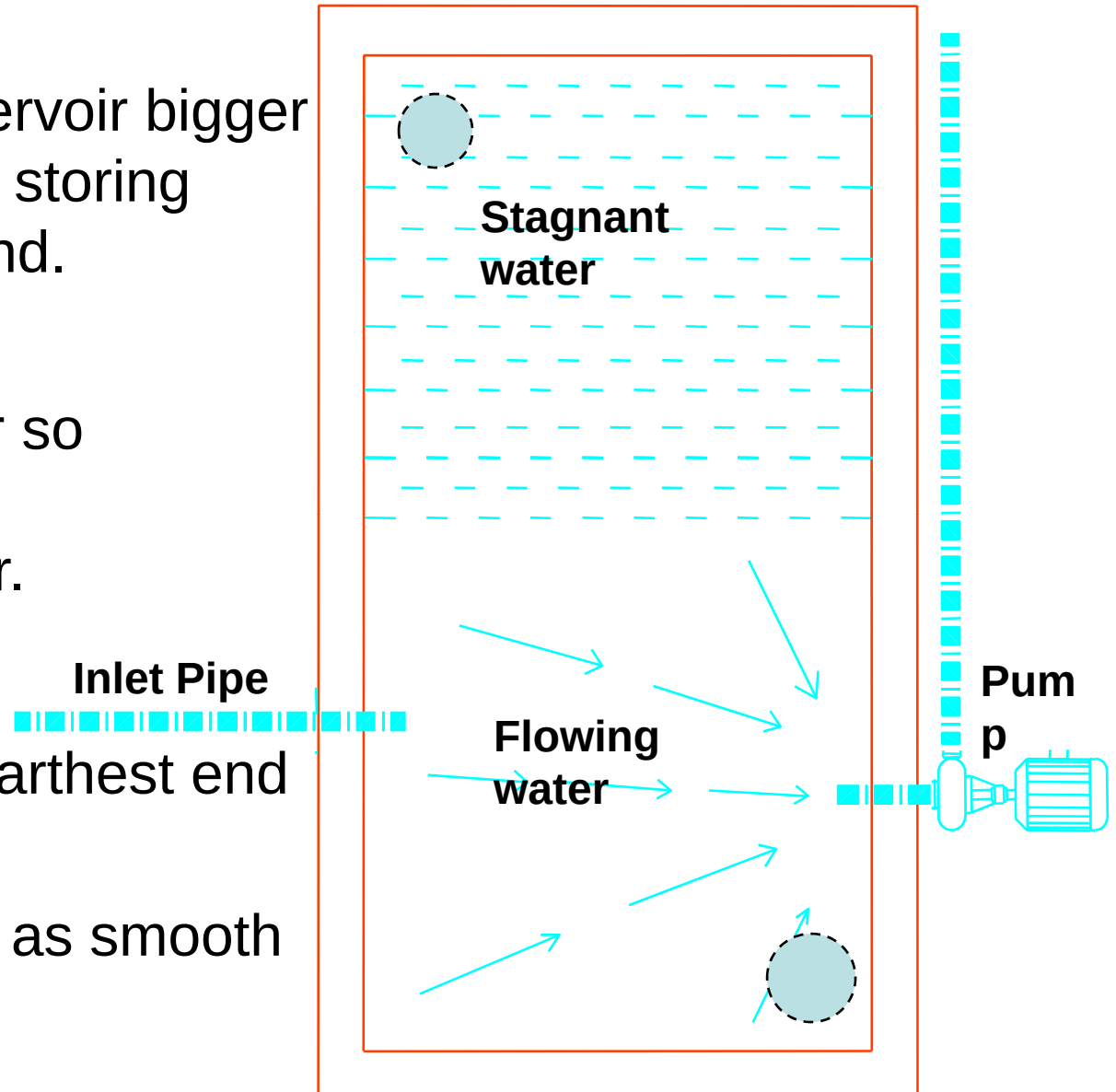
Don't construct UG reservoir bigger than what is needed for storing water of one day demand.

- Cost is more
- Maintenance is costlier so irregular.
- Contamination of water.

Two manhole cover at farthest end shall be set.

Inside finishing shall be as smooth and bright as possible.

Plastic tank shall be made of food grade plastic. Provision for easy cleaning shall be incorporated.



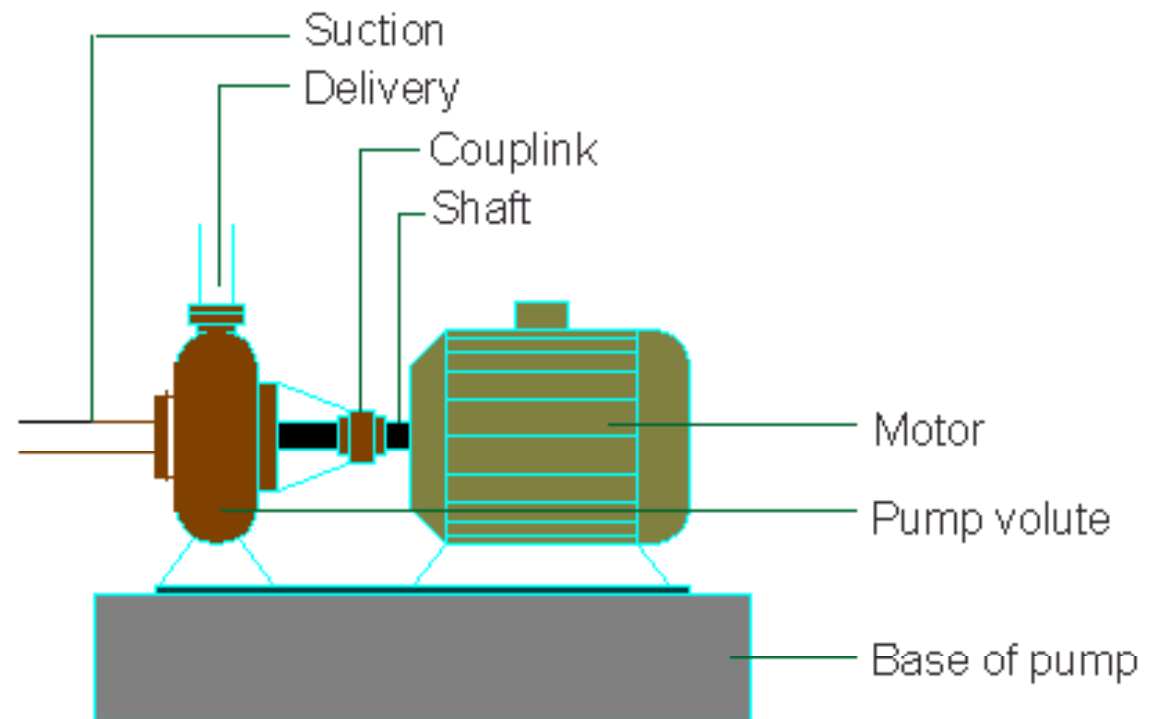
Water Lifting (Centrifugal) Pump

Centrifugal pump should be selected considering its flow rate for particular head at its maximum efficiency. Power consumption should also be considered.

Less flow rate can be considered by increasing the fill time of tank

Pump should be placed by the side of reservoir wall where possible.

Pump shall be installed truly horizontal or vertical depending on the type.



Centrifugal pump

Selection and Installation of Water Supply Pipe

Metal pipes are comparatively longer lasting than plastic pipe.

In Galvanized iron (GI) pipe quality of zinc coating and smoothness of inner surface is also equally important like thickness of pipe wall.

GI pipe shall not be used in hot water supply.

Iron pipes shall not be installed in direct contact with masonry or concrete surface.

Plastic pipe shall be kept installed in dark.

Material of pipe and fittings shall be compatible.

Plastic pipe shall be supported at 4 ft. interval.

Pipe shall be perfectly straight along its axis of run.

Pipe shall not be concealed before get tested for leakage.

Water Supply System

Non circulation type hot water supply system shall not be installed in multi-storey buildings.

Use of pipe, fittings valves etc. shall be kept as minimum as possible.

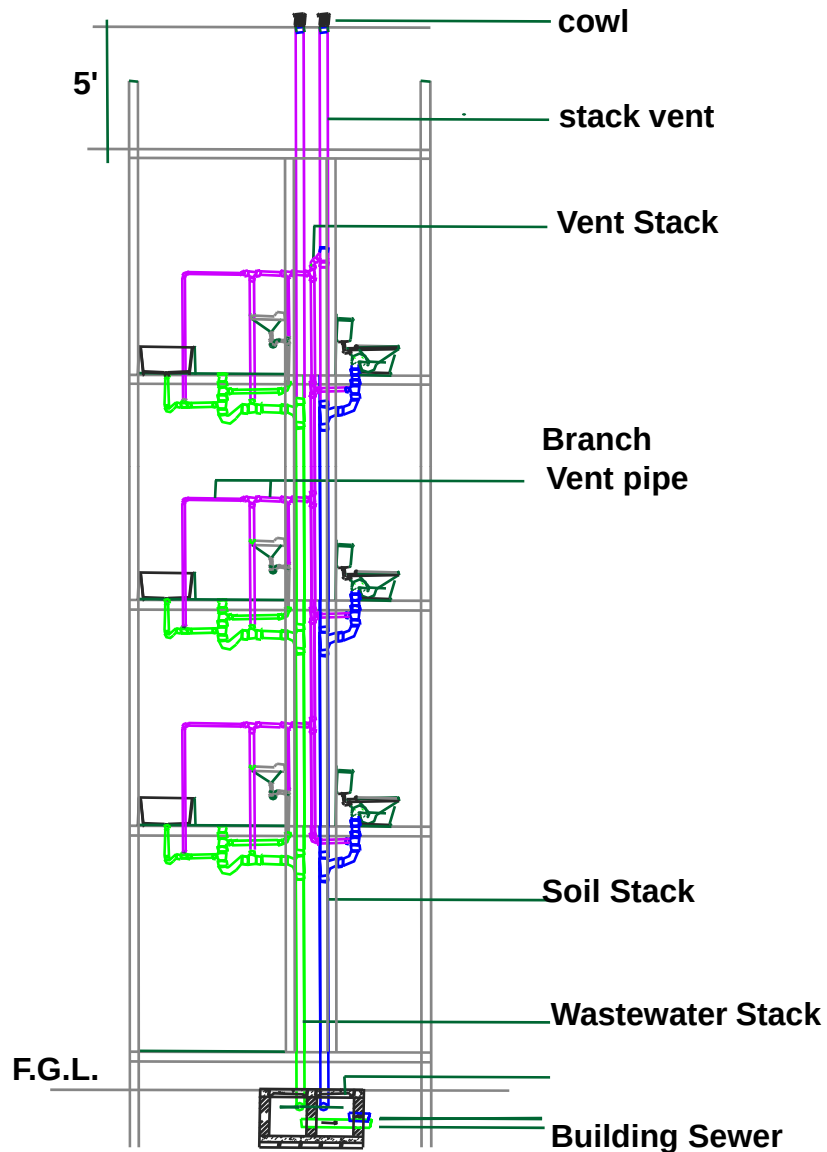
Quick closing valves shall not be used in higher diameter pipes.

Self closing faucet shall be used in public toilets.

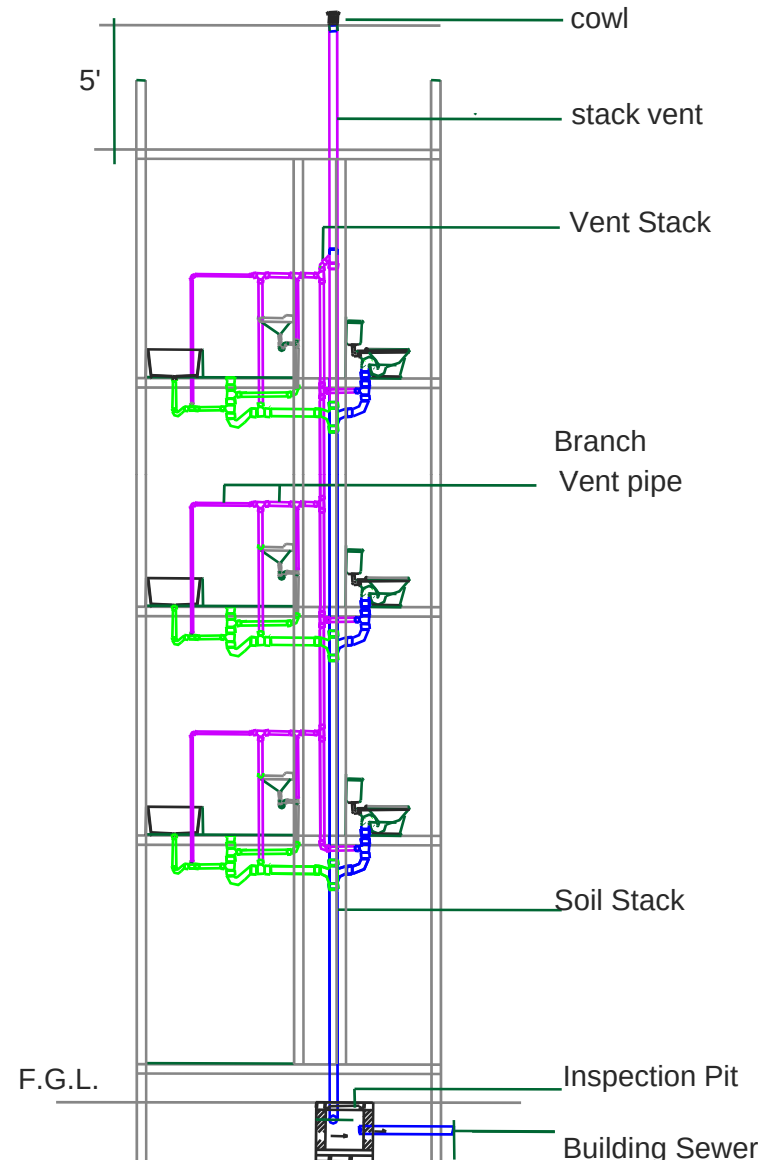
Flexible connector pipe between pipe and faucets or equipments shall be as short as possible.

Water supply piping shall be cleaned and disinfected by flushing with chlorine water. Cleaning and Disinfecting the system: chlorination by 50mg/l chlorinated water for 24 hrs or 200mg/l for 3 hrs. After chlorination total system shall be flushed till removal of chlorine (BNBC 6.16).

Building Drainage piping systems



TWO PIPE SYSTEM



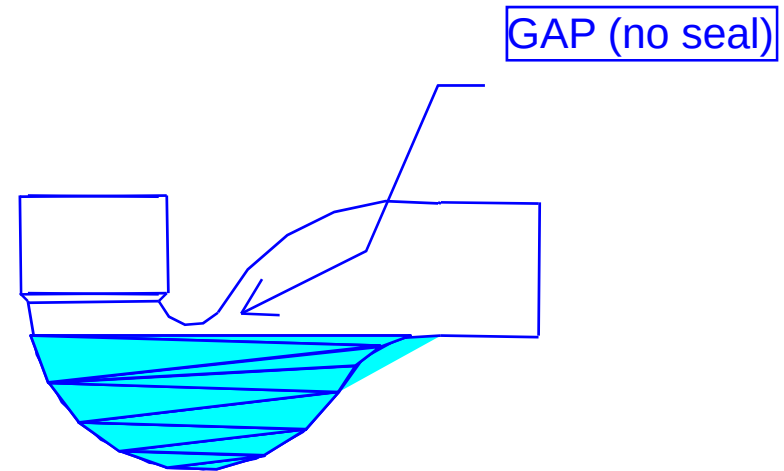
ONE PIPE SYSTEM

Trap

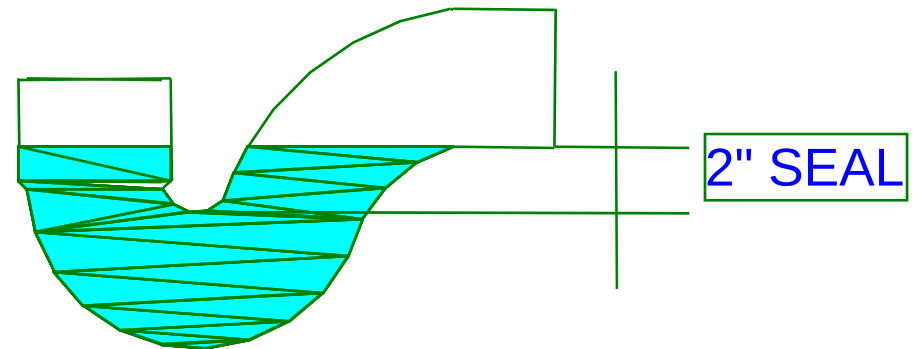
Trap is a fitting used to prevent foul gas to ingress into the room through fixture drainage outlets

Every fixtures shall be fitted with trap

Traps shall have minimum seal of 50 mm.



FAULTY TRAP

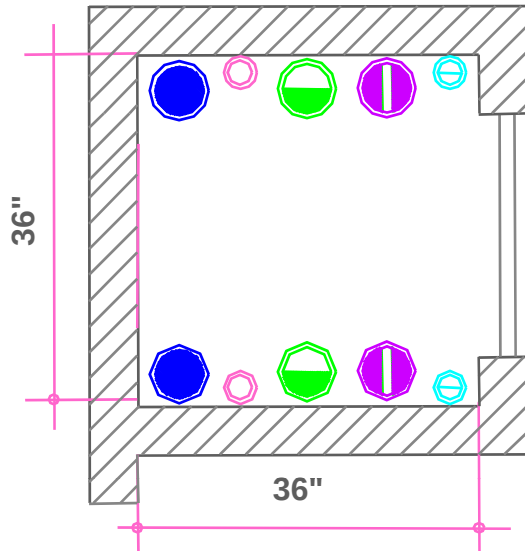


PERFECT TRAP

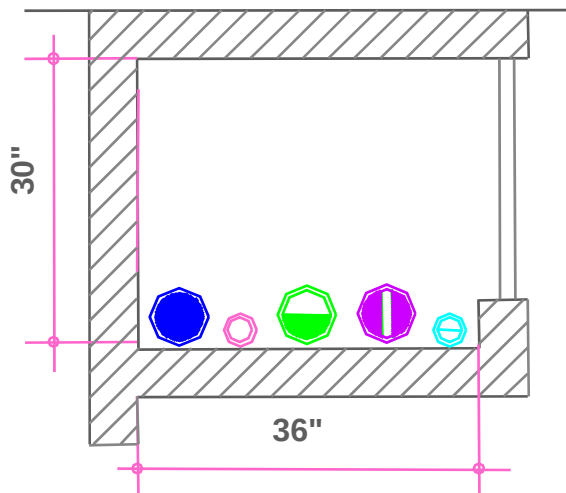
Pipe duct and shaft

Ducts and shafts should be sufficiently big enough to house pipes and its fittings and allow maneuvering for maintenance works.

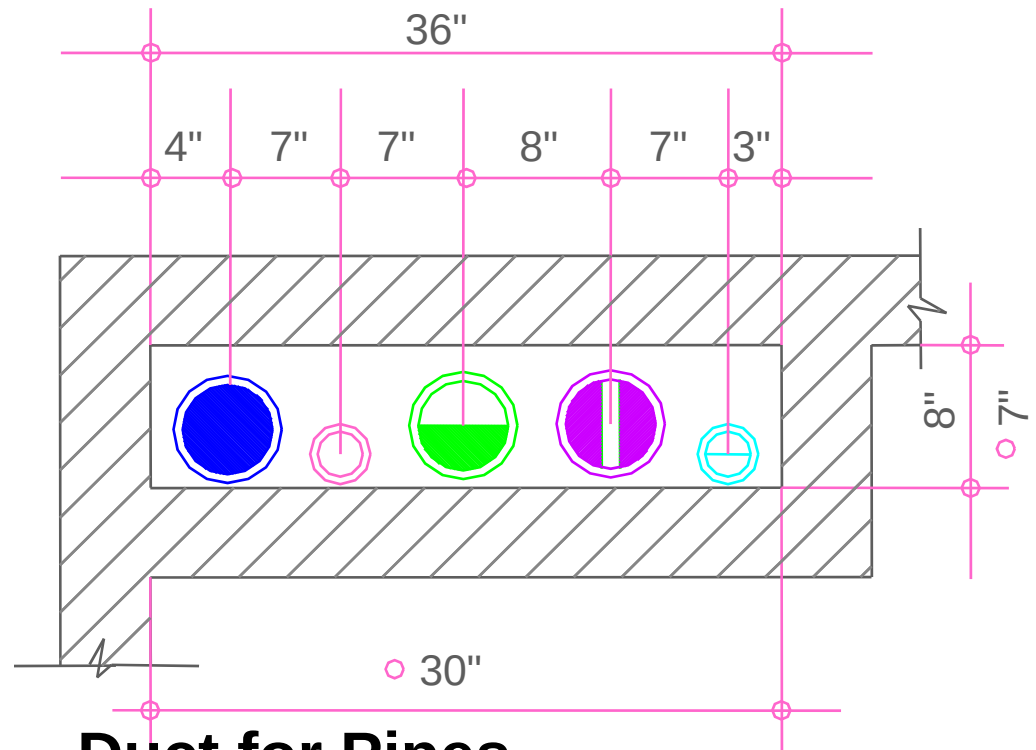
Ducts or Shafts shall not have continuous passage



Shaft: Pipes at two sides



Shaft: Pipes at one side



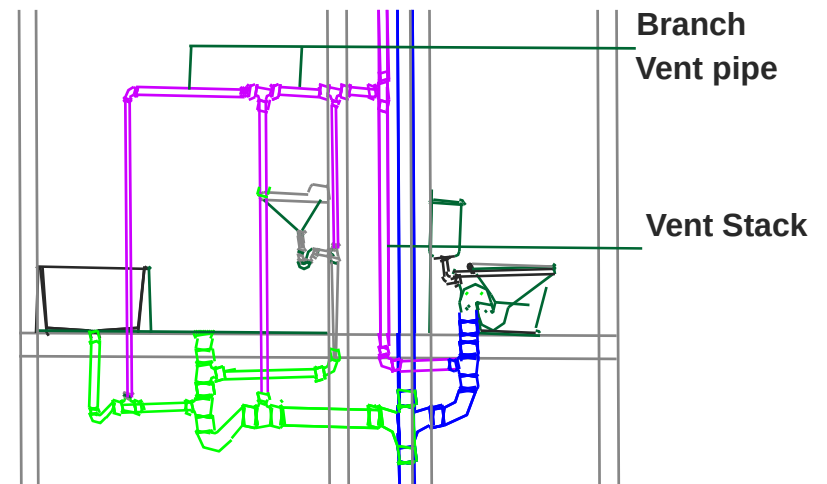
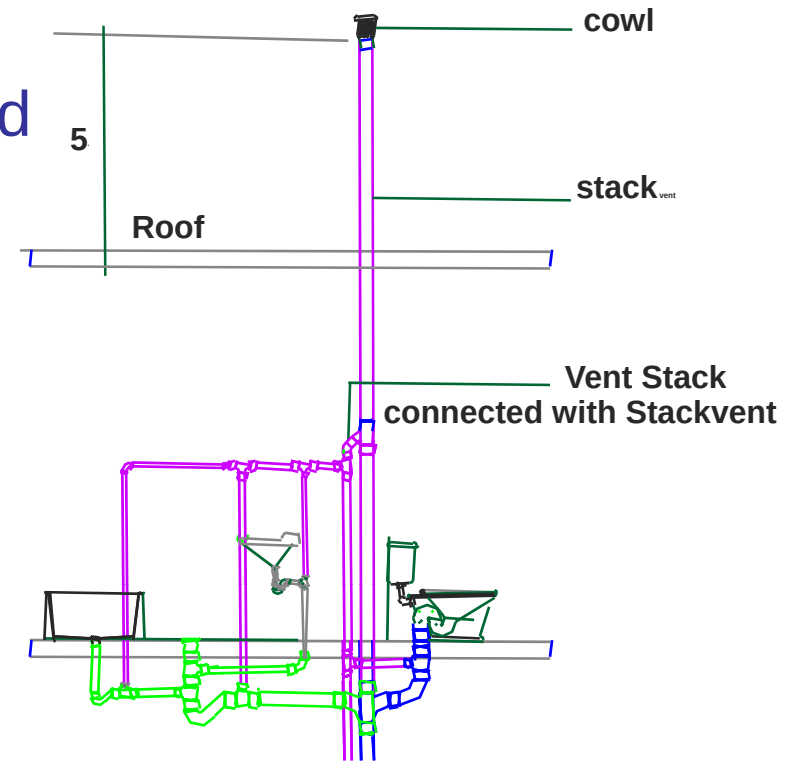
Duct for Pipes

Ventilation

Ventilation in drainage pipe is provided for maintaining balanced atmospheric pressure in the drainage system.

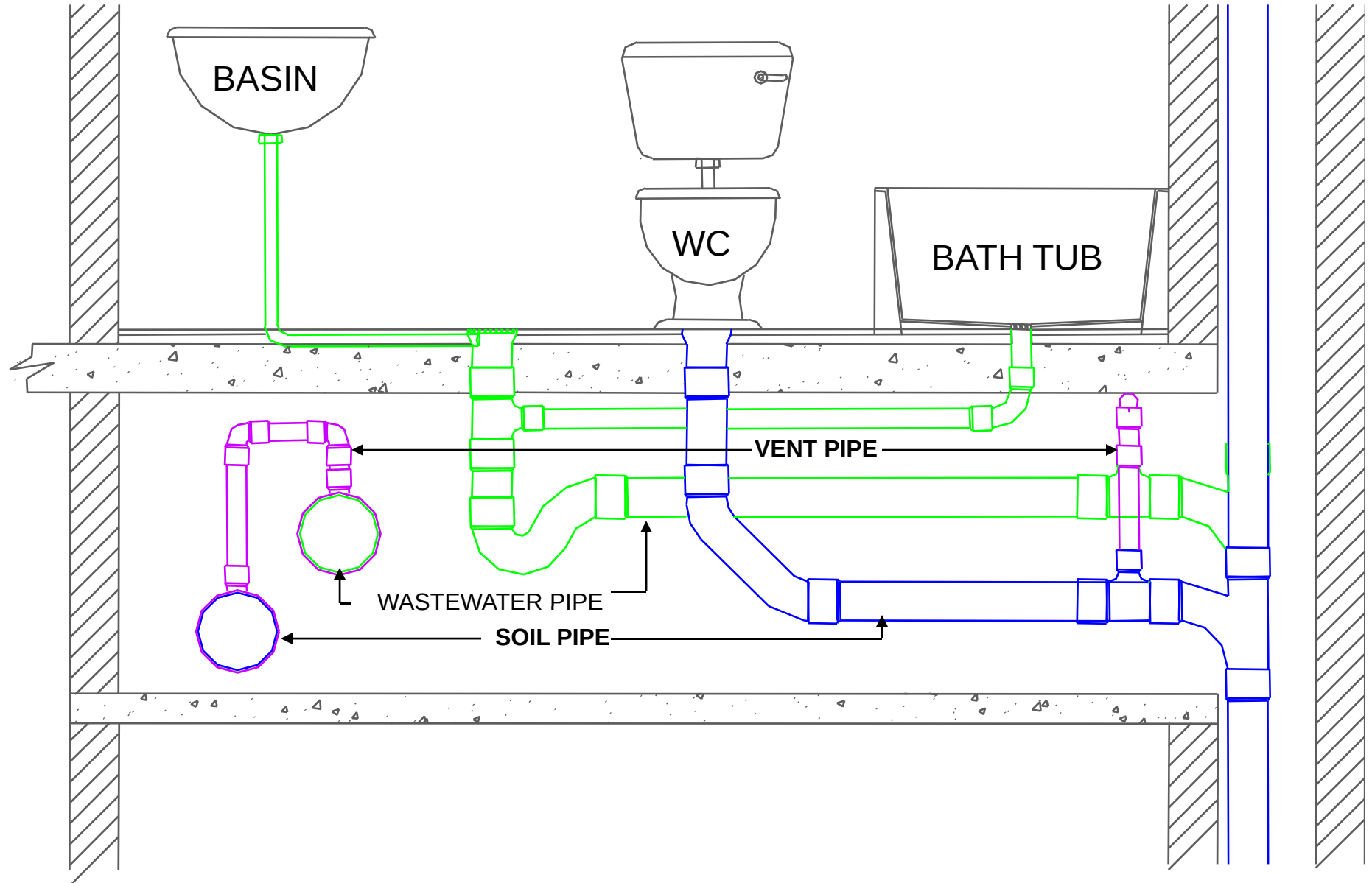
Problems of non-ventilation:

- Interruption in drainage flow.
- Water seal of traps is lost.
- Ingression of foul gas through drainage outlet of fixtures.
- Blowing of wastes through drainage outlet of fixtures (water closets).
- Pollution of indoor environment and adverse affect on occupational health



HAQ VENTING METHOD

NOTE: Yet to be approved by competent authority.

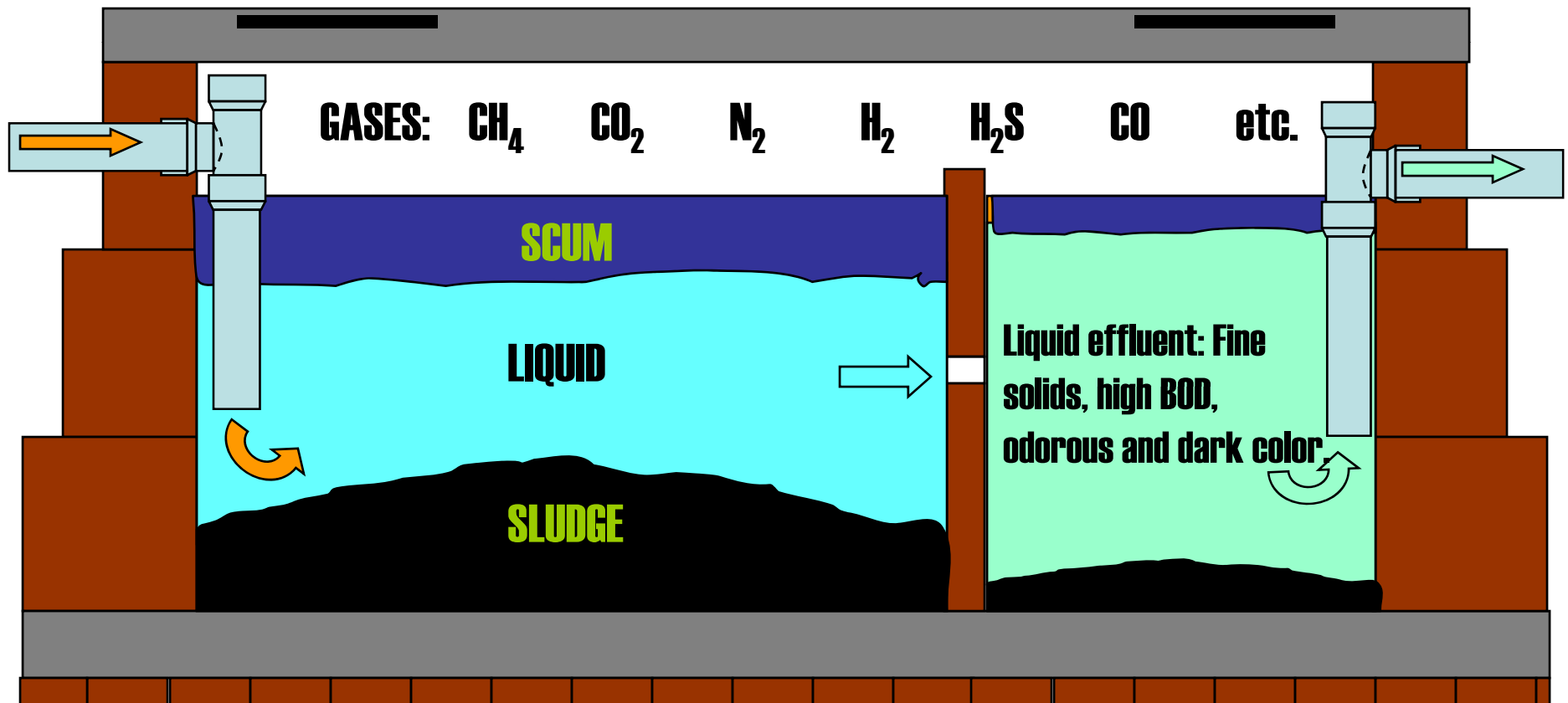


Septic Tank

Maximum 300 users Septic Tank can be built.

Two chamber Septic tank is recommended but single chamber septic tank can be used. Rectangular Septic tank of width-length ratio 1:3 or 4 is preferable. First chamber is double the 2nd chamber.

For effective starting of operation of a new septic tank put into it about 1kg sludge from other septic tank. Desludging shall be done when effluent quality seems to be like raw sewage.

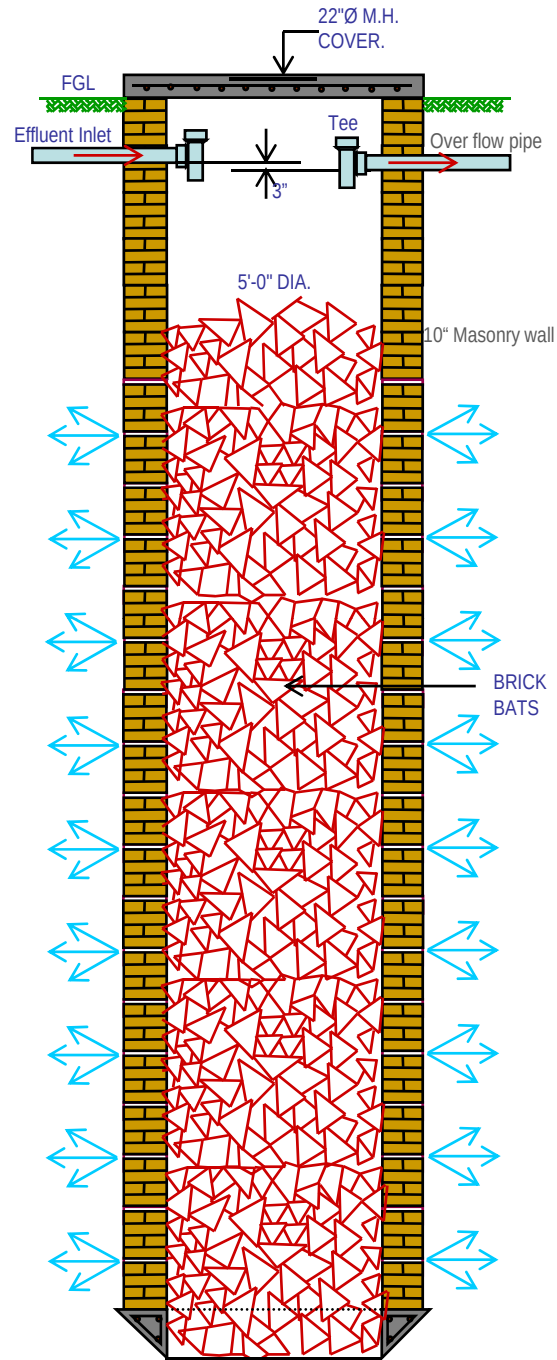


Soak Well

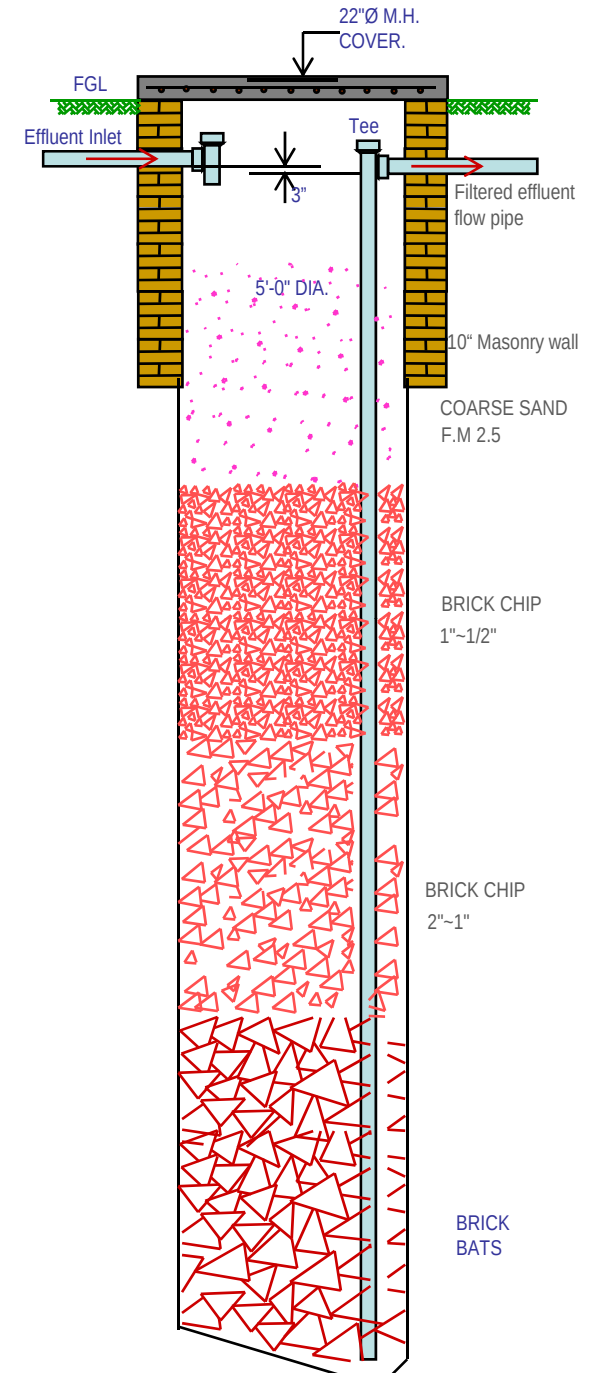
Soak Well Does not work good when-

Soil is clay.

Water table is at high level
i.e. near to ground level.



SOAK WELL for SANDY SOIL



SOAK WELL for CLAY SOIL