

Civil Engineering Drawing & Graphics

Course Code: CE- 212

Lecture – 3



Engr. Nadeem Ullah
Department of Civil Engineering,
Iqra National University Peshawar

Plumbing Drawings

Introduction

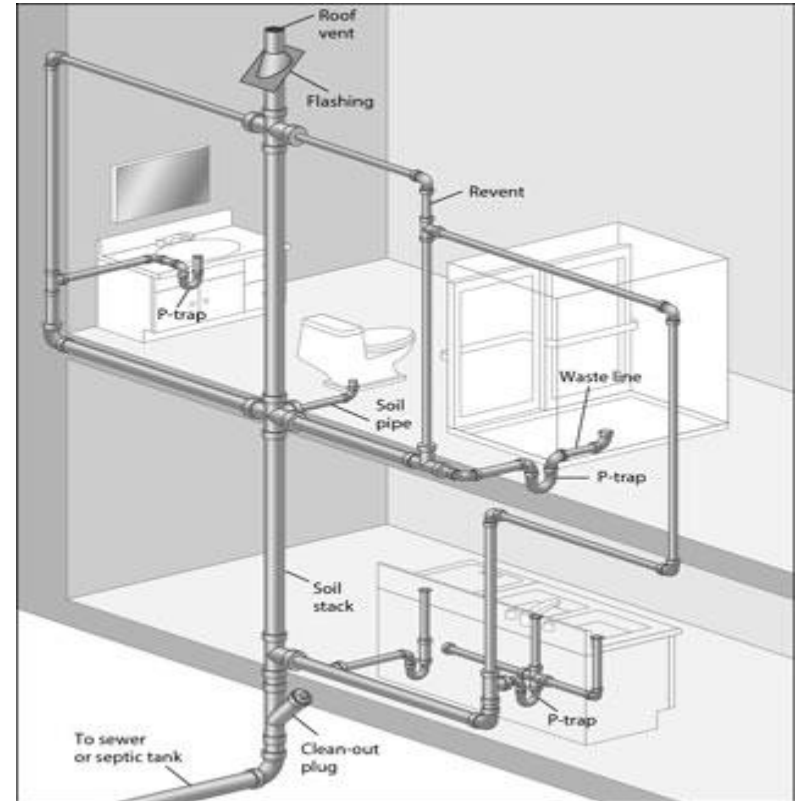
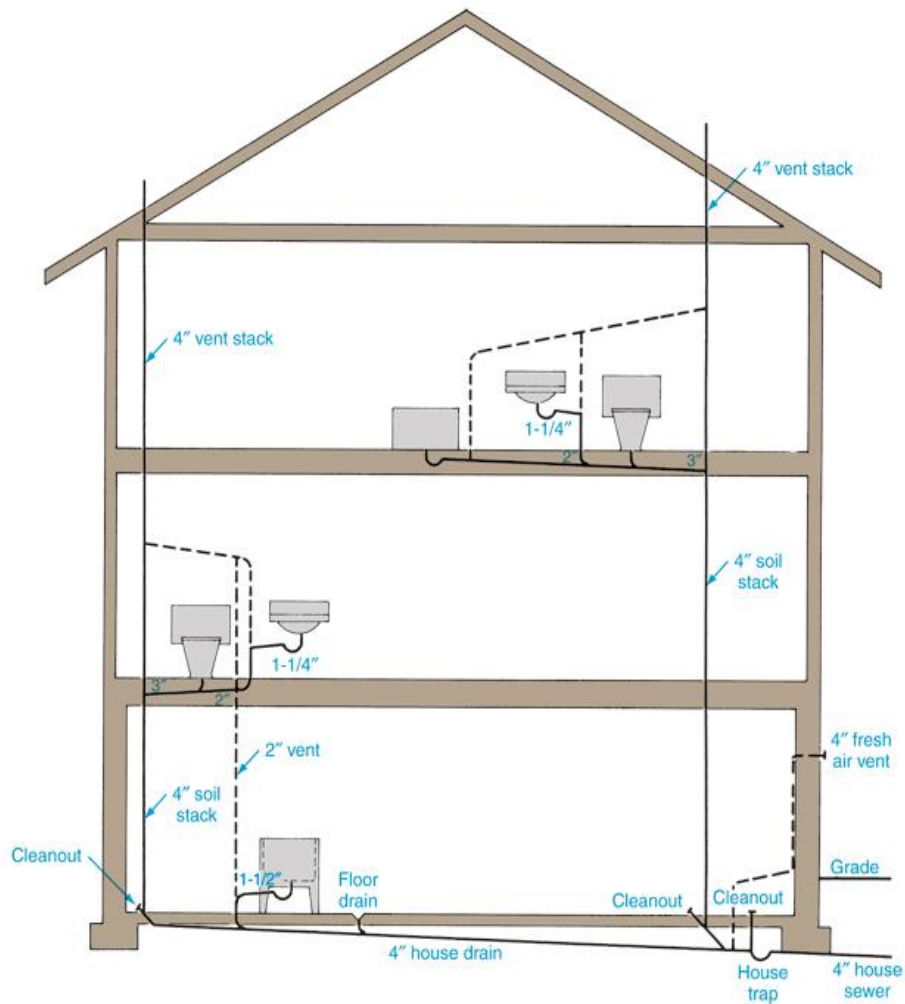
These drawings show water supply and sewage systems of any building, indicating the placement of pipe lines. e.g. (G.I, UPVC & PVC etc.).

A complete plumbing system provides an adequate supply of water and removes wastewater properly.

There are three principal parts of plumbing system:

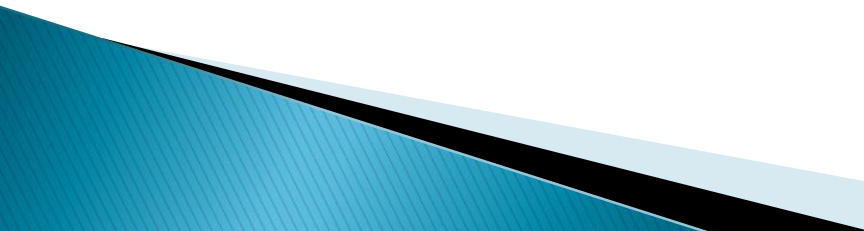
1. Water supply system.
2. Wastewater and waste removal system.
3. Plumbing fixtures.

Typical Drainage System



Components of a Typical drainage system

Wastewater and Waste Removal

- Wastewater and other wastes are carried to the sanitary sewer or septic tank through the waste removal system.
 - These pipes are isolated from the water supply system and must be sized for sufficient capacity, have the proper slope and venting, and have provisions for cleanouts.
 - Typically it is practical to drain as many of the fixtures as possible into a single main drain.
 - The drainage system is not under pressure and depends on gravity to carry the waste into the sewer.
- 

Wastewater and Waste Removal

A vertical drain pipe that collects waste from one or more fixtures is called a soil stack.

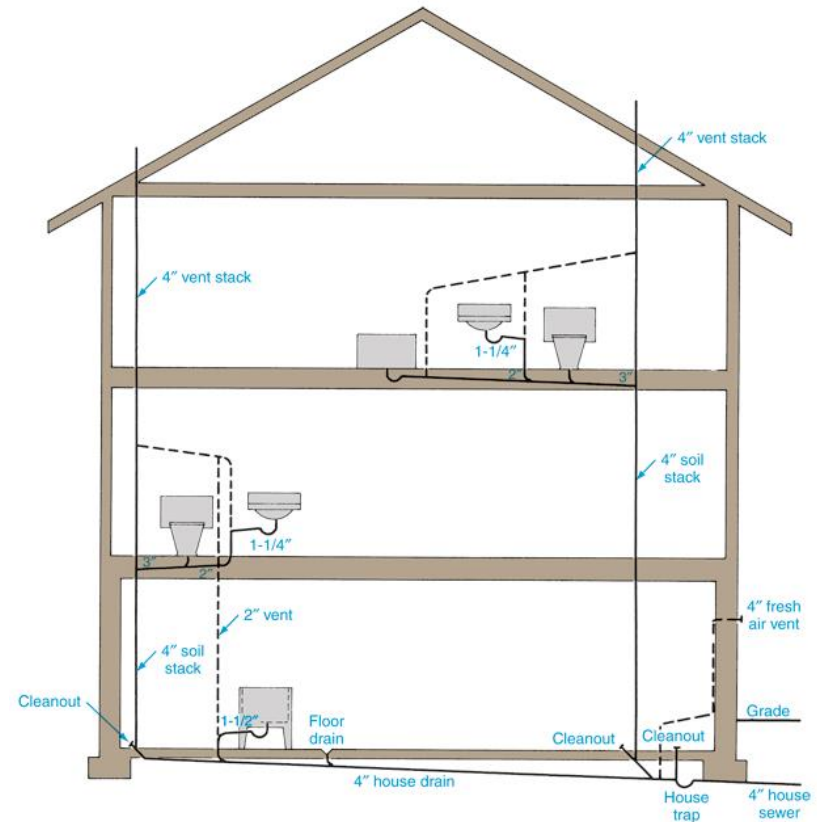
Soil stacks that drain water closets are called main stacks.

Every house must have at least one main stack, which is generally 3" in diameter.

Each bathroom must have a main stack.

Stacks that do not drain water closets are called secondary stacks.

Secondary stacks are 1-1/2" diameter.



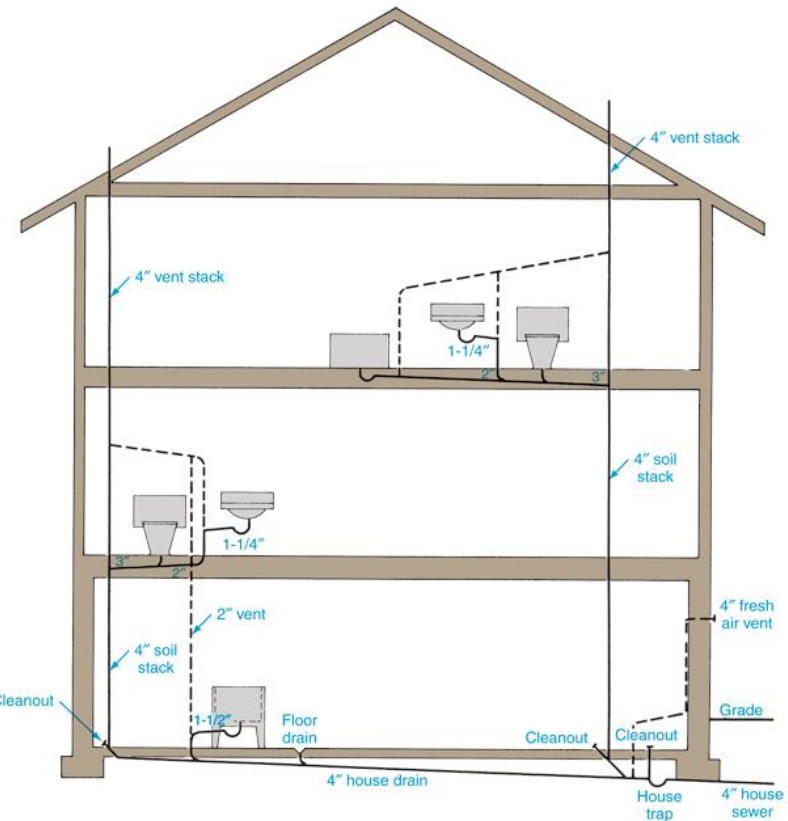
Wastewater and Waste Removal

Fixtures are connected to the stack using a branch main.

All stacks are extended and being emptied into the house drain.

All structures must have at least one house drain, but may have several.

The house drain becomes the house sewer once it is outside the house. The house sewer empties into the city sanitary sewer or private septic system.

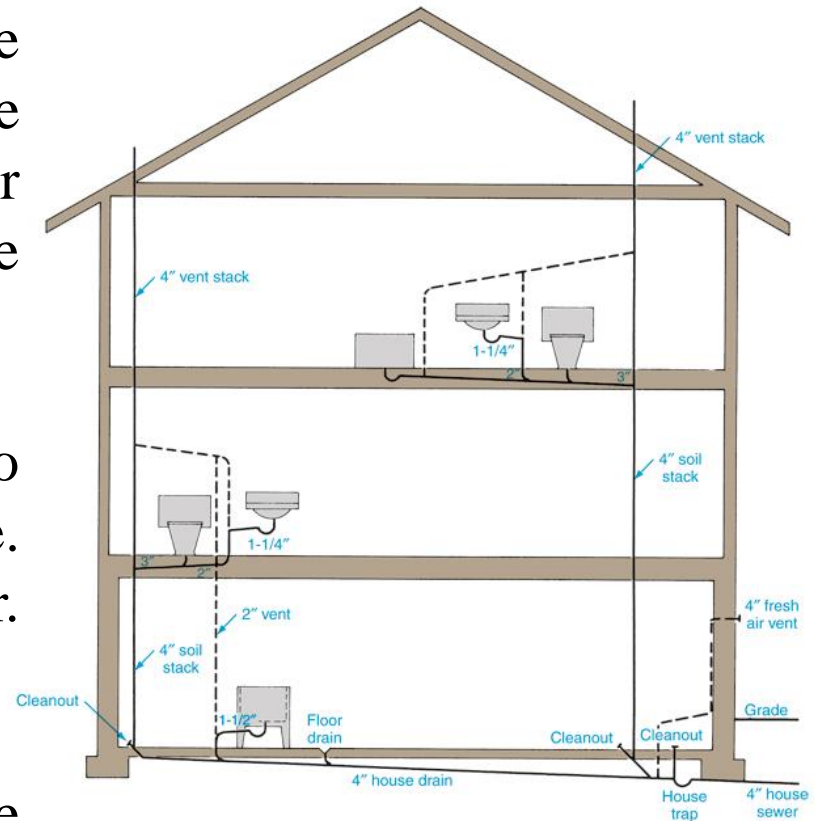


Wastewater and Waste Removal

Gases from the system dissipate through the vent stack—12" above roof. The vent stack provides an air inlet to the drainage system to operate properly

A trap is installed below each fixture to prevent gases from entering the house. The trap is always filled with water. Water closets have a built-in trap.

Each stack requires a cleanout at the base.

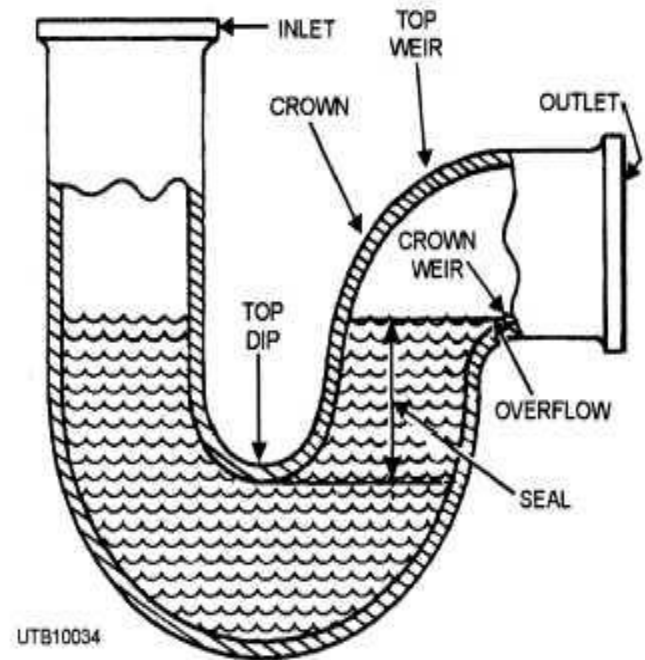


Traps

The **trap** most commonly used with plumbing fixtures is the **P-trap**.

Traps are required because they prevent sewer gases from entering a building causing bad smell and serious illness or death.

The term **Trap Seal** refers to the water being held in the bent portion of a fixture trap. The trap seal forms a seal against the passage of sewer gases through the trap and into the building.



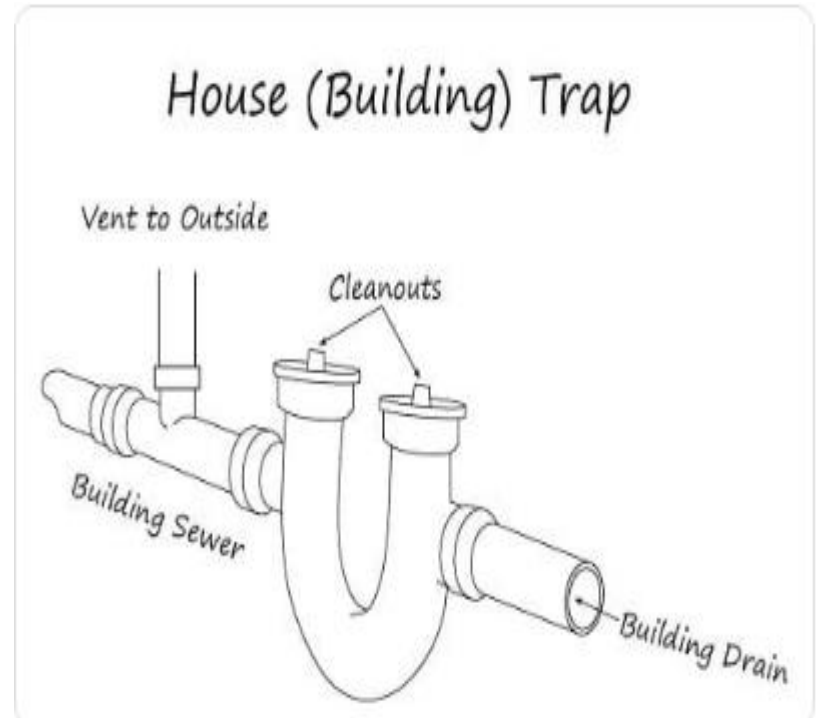
House Trap

Building (House) traps are provided in the main building sewer.

It shall be provided with a cleanout and a relief vent or fresh air intake on the inlet side of the trap.

Relief vents or fresh air intake shall be carried above grade and shall be terminated in a screened outlet located outside the building.

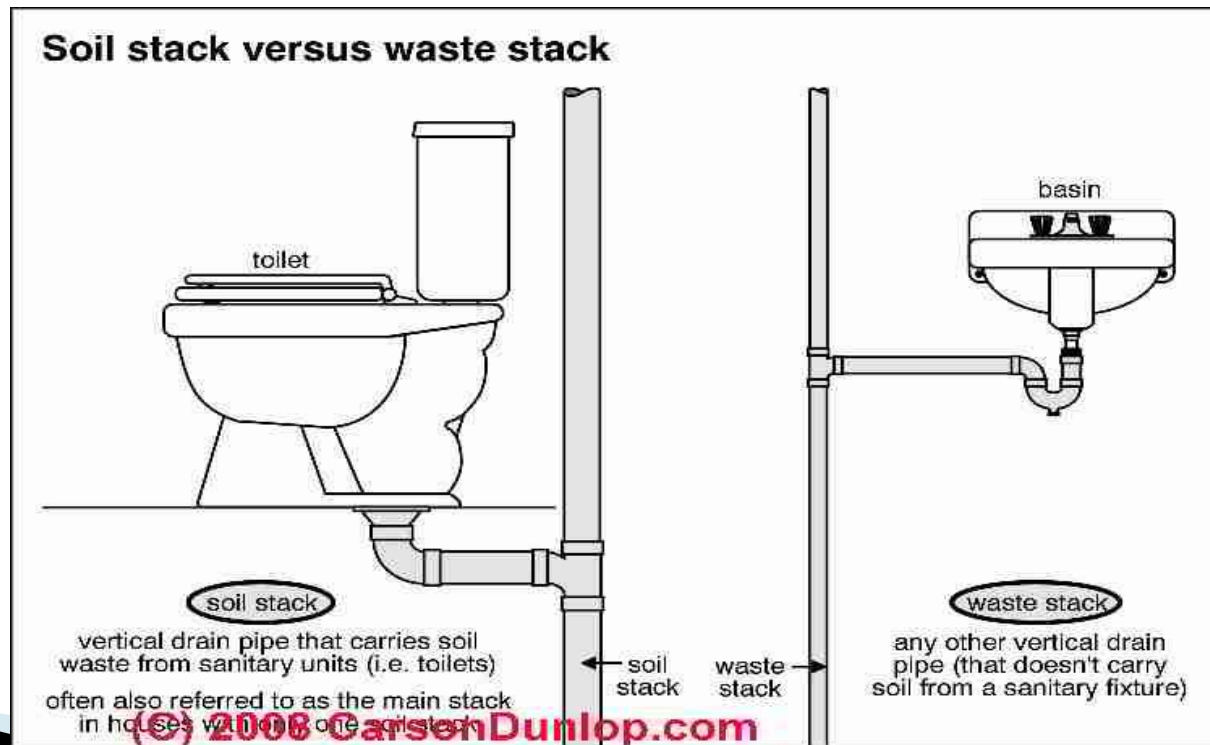
The size of the relief vent shall not be less than one-half the diameter of the drain to which the relief vent or air intake connects.



Soil stacks and waste stacks

A **soil stack** is a vertical drain pipe that carries soil waste from sanitary units (i.e. toilets.)

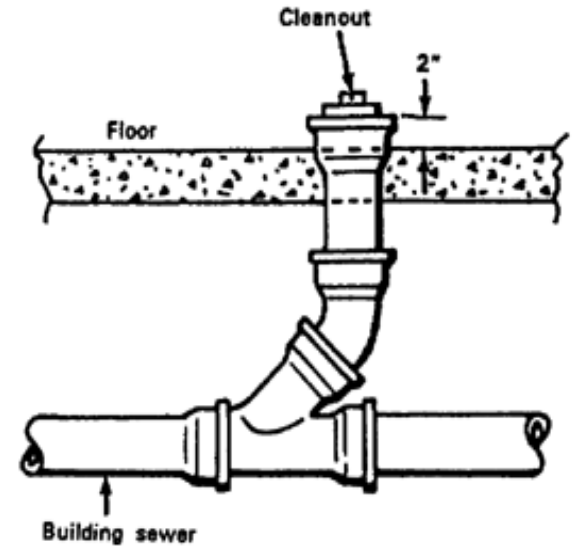
A **waste stack** is any other vertical drain pipe that doesn't carry soil from a sanitary fixture.



Plumbing Cleanout

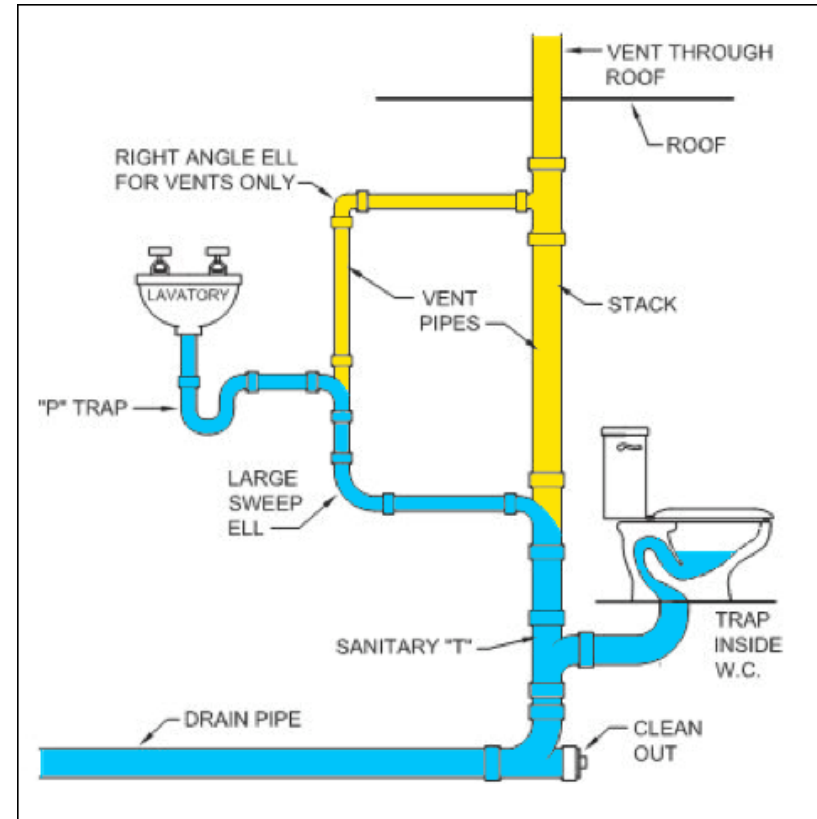
A plumbing cleanout is a cleanout fitting with a removable plug used in wastewater system. It is designed to help keep remove any type of debris that could cause any type of **stoppage** in the sewerage lines.

Cleanouts are usually placed at the connection point between the sewer lines and the drain lines where the base is located of a **vertical stack** and at all places where the pipe direction changes at **90 degrees**.



Plumbing Air Vents

Drain pipes remove water and waste from a building, the **plumbing vent** pipe – also known as a **plumbing air vent** – removes gas and odors. It also allows fresh air into the **plumbing** system to help wastewater flow smoothly through the drain pipes. However, no wastewater runs through the **plumbing vent** pipe.

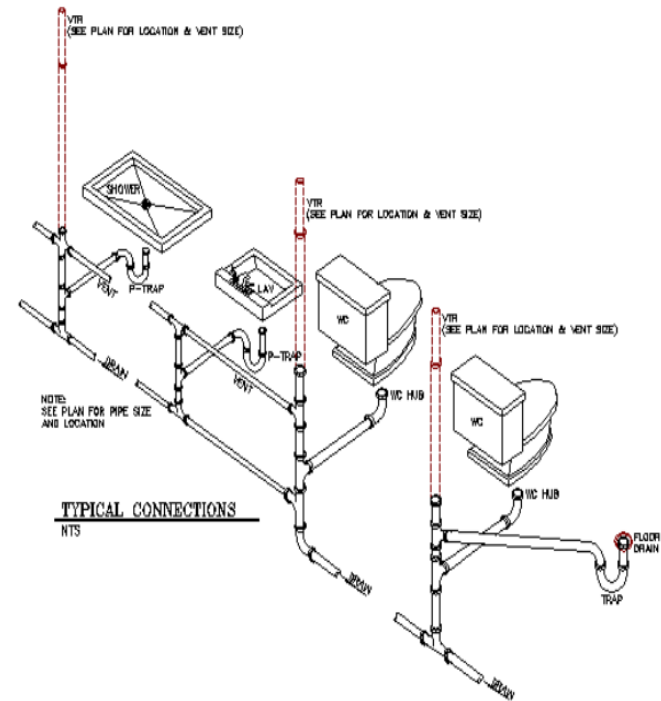


Riser Diagram

Riser diagrams are used as supplementary details in order to show more clearly how the plumbing system is to be installed.

A riser diagram is not drawn to scale but should be correctly proportioned.

The proper use of symbols for the piping and fittings makes it easier to read and interpret the drawing.



Typical Toilet Waste Connection

Plumbing Plan

The Plumbing Plan is a plan view that shows the complete plumbing system. The plumbing plan shows the location, size, and type of all plumbing fixtures, pipes etc .

The plumbing plan should include:

- Waste lines and vent stacks.

- Drain and plumbing fixture locations.

- Size and type of pipe to be used.

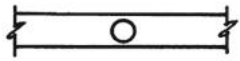
- A plumbing fixture schedule.

- Symbols Legend.

- General notes.

A plumbing plan is required for each floor of the house.

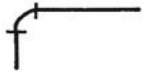
Plumbing Symbols



Soil stack – Plan view



Gate valve



90° Elbow – Horizontal



45° Elbow – Horizontal



Elbow – Turned up



Elbow – Turned down



Meter



Hose bib – Elevation



Hose bib – Plan view



Coupling or sleeve



Tee – Horizontal



Tee – Turned up



Tee – Turned down



Cleanout (CO)



Floor drain – Plan view



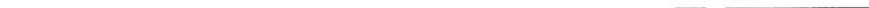
Floor drain – Section

CW

Cold water

HW

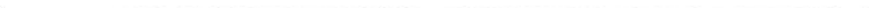
Hot water



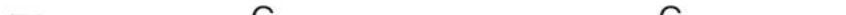
Cold water line



Hot water line



Soil or waste line



G

Gas line

G



S

Sprinkler line

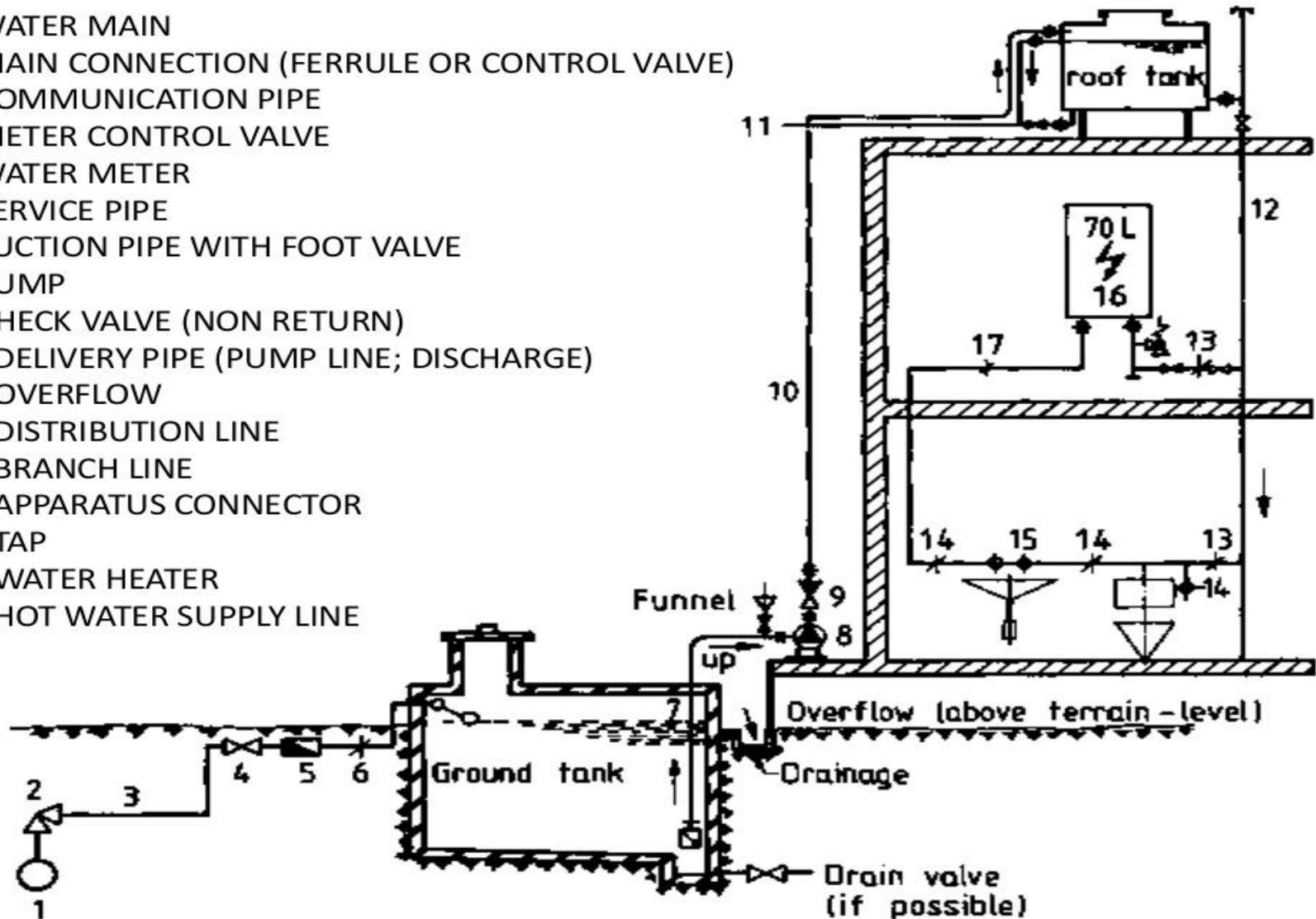
S



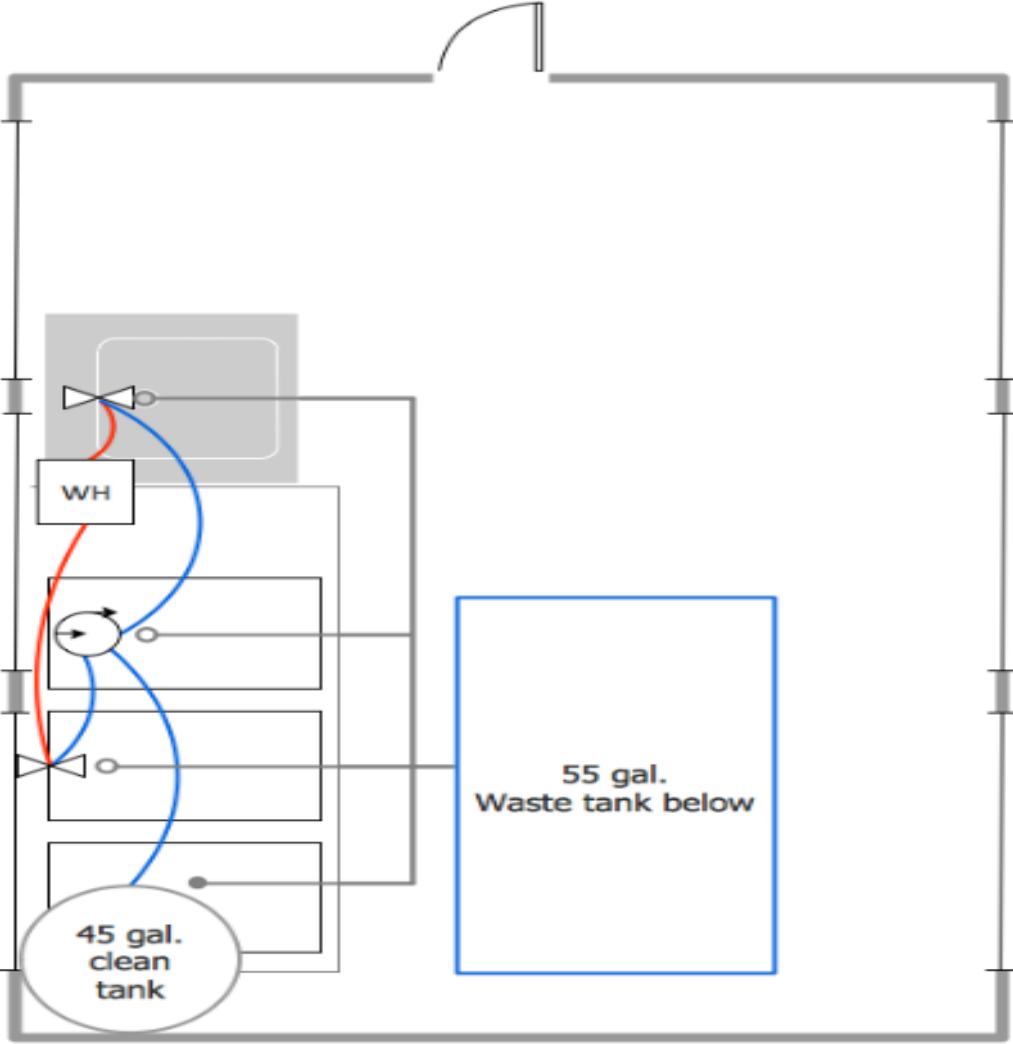
Vent pipe

Domestic Water connection to overhead tank

- 1 WATER MAIN
- 2 MAIN CONNECTION (FERRULE OR CONTROL VALVE)
- 3 COMMUNICATION PIPE
- 4 METER CONTROL VALVE
- 5 WATER METER
- 6 SERVICE PIPE
- 7 SUCTION PIPE WITH FOOT VALVE
- 8 PUMP
- 9 CHECK VALVE (NON RETURN)
- 10 DELIVERY PIPE (PUMP LINE; DISCHARGE)
- 11 OVERFLOW
- 12 DISTRIBUTION LINE
- 13 BRANCH LINE
- 14 APPARATUS CONNECTOR
- 15 TAP
- 16 WATER HEATER
- 17 HOT WATER SUPPLY LINE



Typical Domestic Water supply diagram



	In-line valve
	Water heater
	Water pump
	Hot water
	Cold water
	Grey water

Thank You

