

Environmental Protection



SEWER APPURTANCES

-By

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Manhole

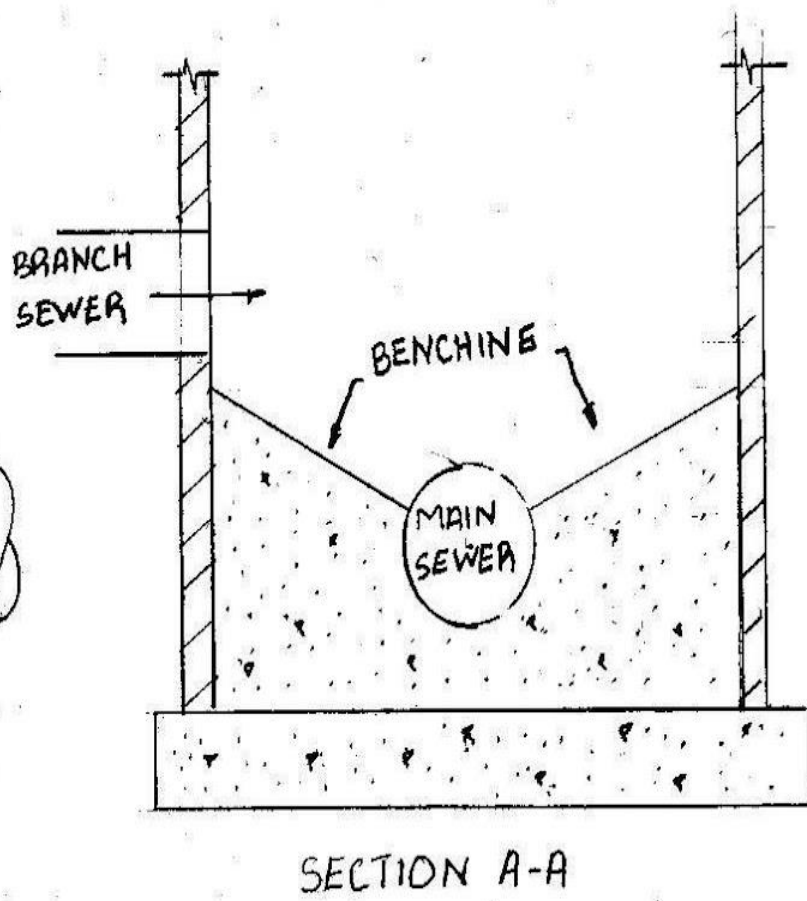
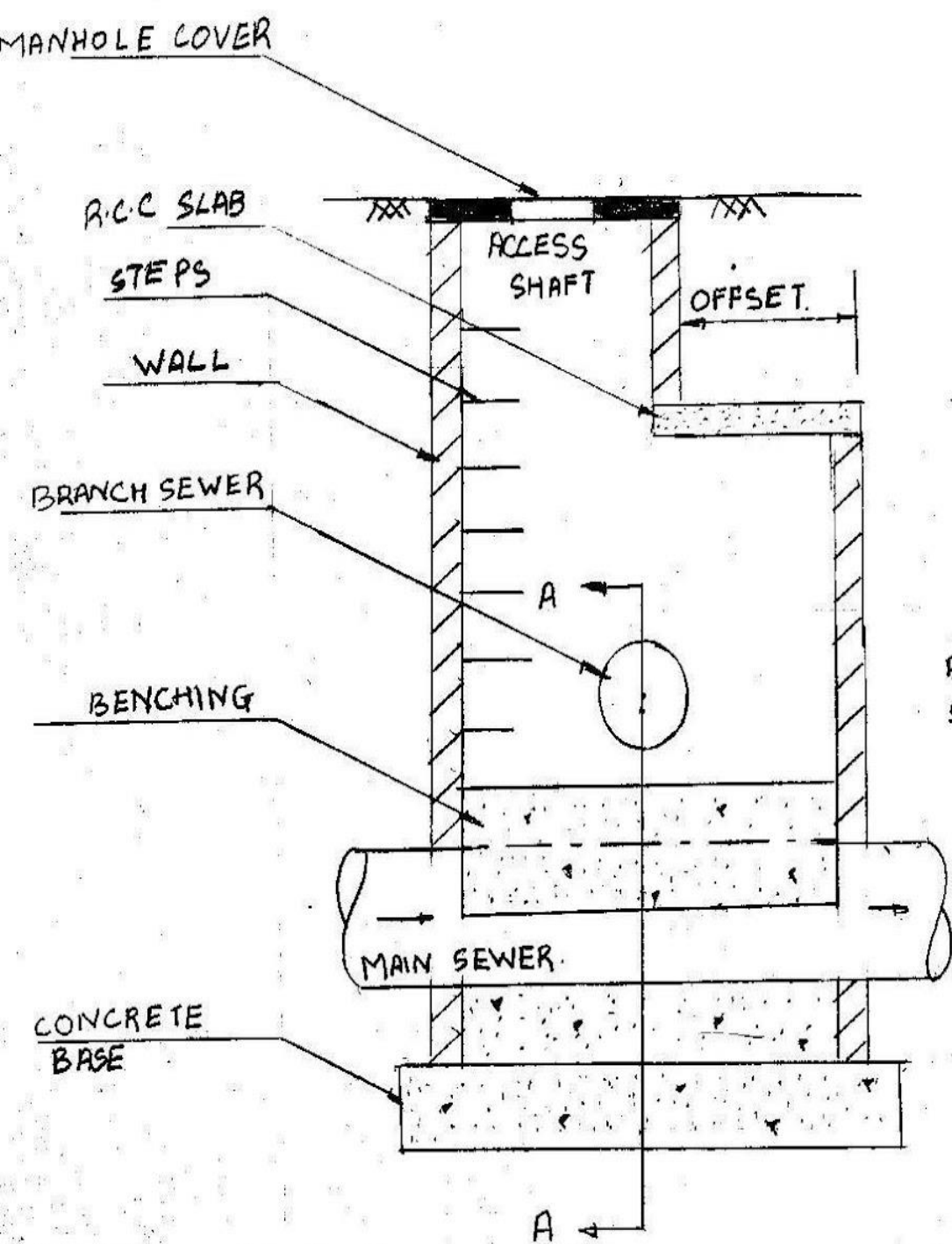
- Manholes are masonry or R.C.C. chamber constructed at suitable intervals along the sewer lines for providing access into them.
- Manholes are classified as follows:
 - Shallow Manhole
 - Normal Manhole
 - Deep Manhole

Shallow Manhole

- It is about 0.70m to 0.90m depth.
- It is constructed at the start of a branch sewer or at places, which are not subjected to heavy traffic.
- Such a manhole is provided with a light cover at its top and is called as **inspection chamber**.
- Generally these types of manholes are provided at the domestic areas.

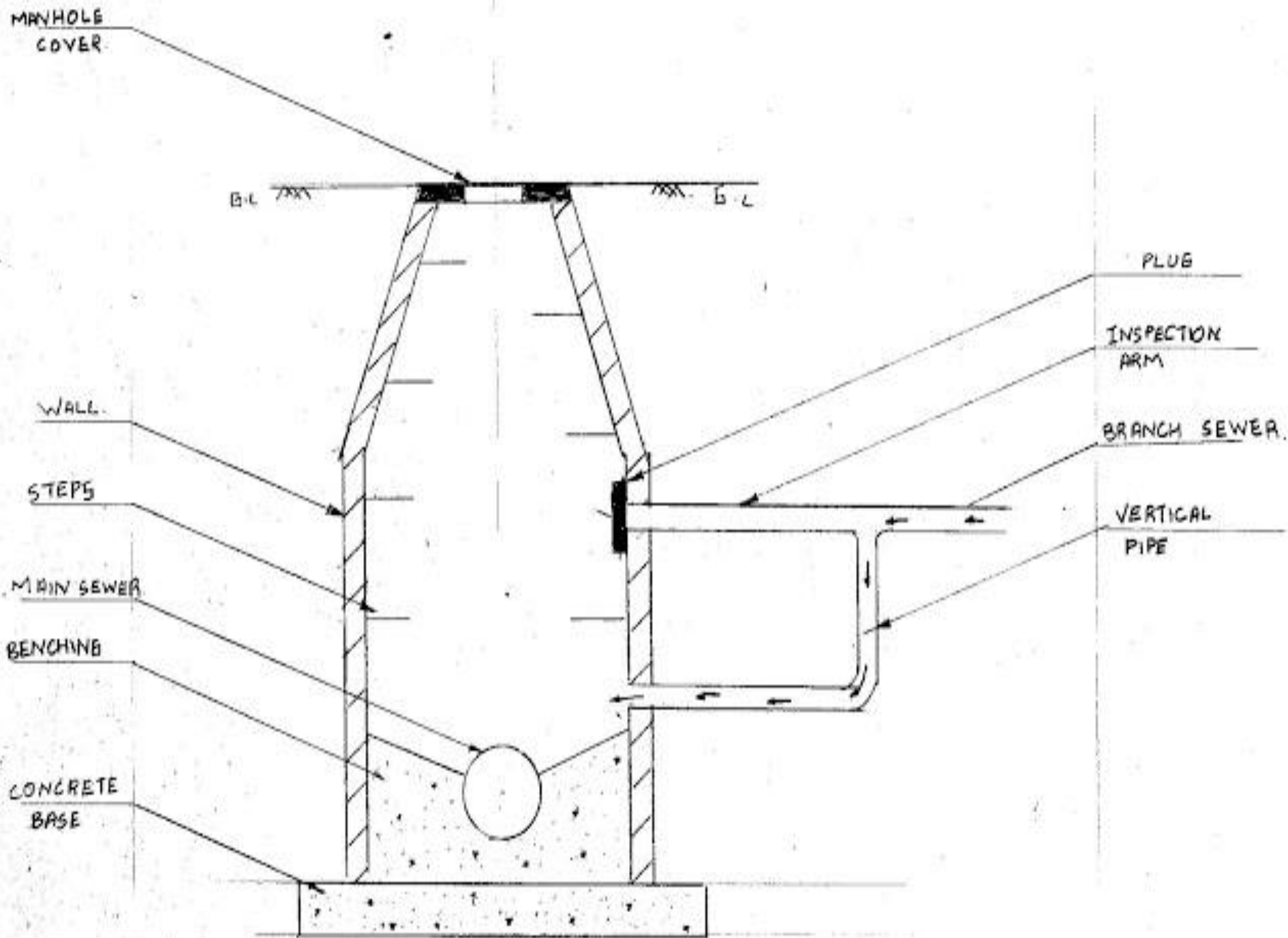
Deep Manhole

- It is having depth more than 1.5m.
- The section of such a manhole is generally not kept the same.
- The size in the upper portion is reduced by providing an offset.
- Steps, etc. are provided in such a manhole for facilitating descending into the manhole and to enable the workers to go up into its bottom.



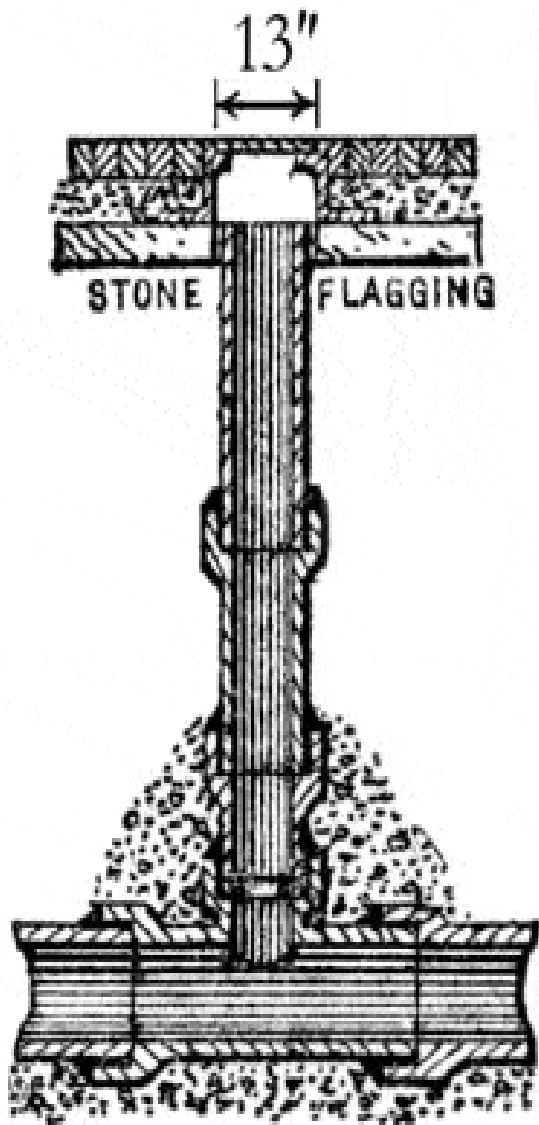
Drop Manhole

- The manhole, in which a vertical pipe, is used is called a **drop manhole**.
- When a branch sewer enters a manhole by more than 0.50m to 0.60m above the main sewer.
- The sewage is generally not allowed to fall into the manhole.
- The sewage is brought into it through a down pipe taken from the branch sewer to the bottom of the manhole.

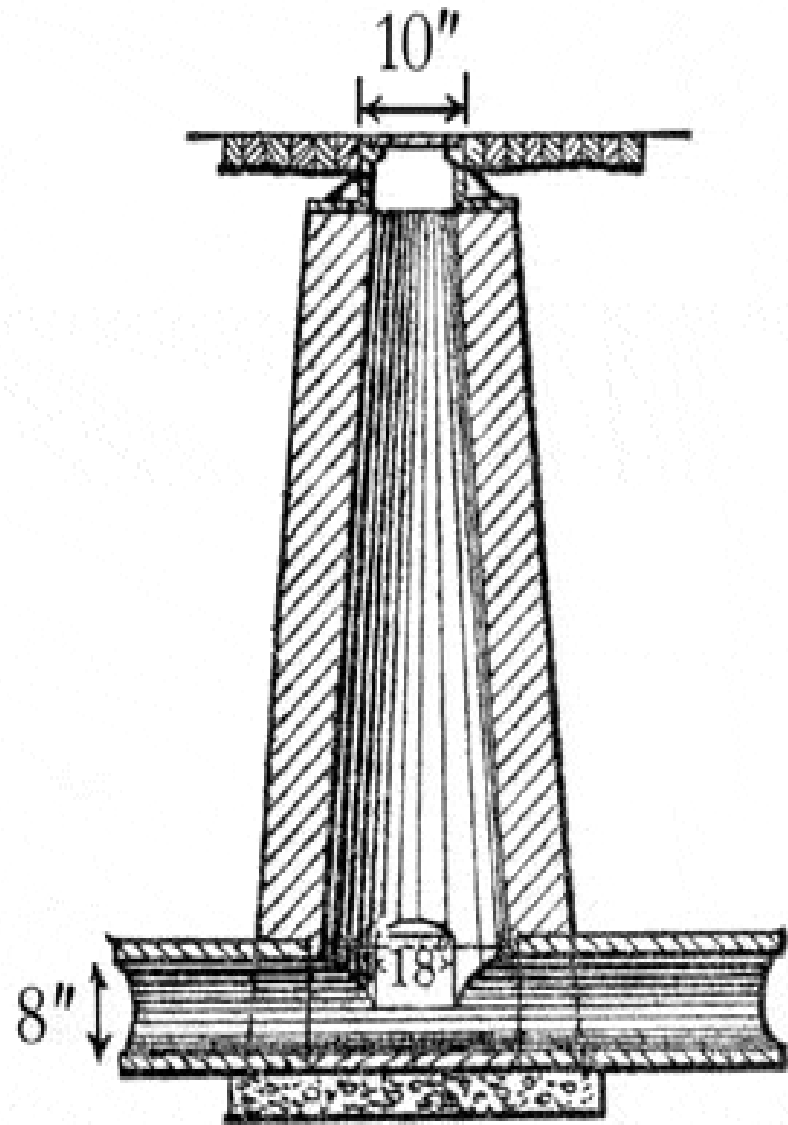


Lamp holes

- Lamp holes are the small openings on sewers to permit the insertion of a lamp into a sewer.
- The lamp light is then viewed from the upstream as well as the downstream manholes.
- The obstructed light confirms the obstructions in the sewers.



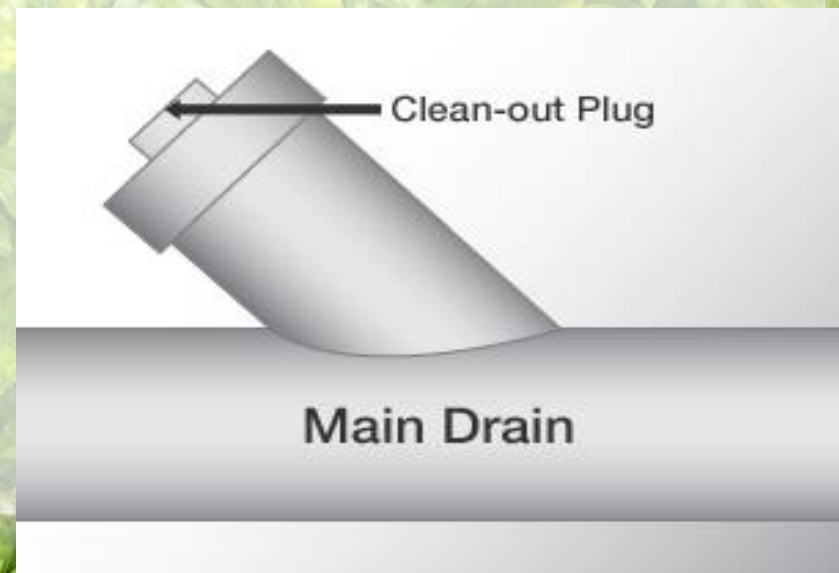
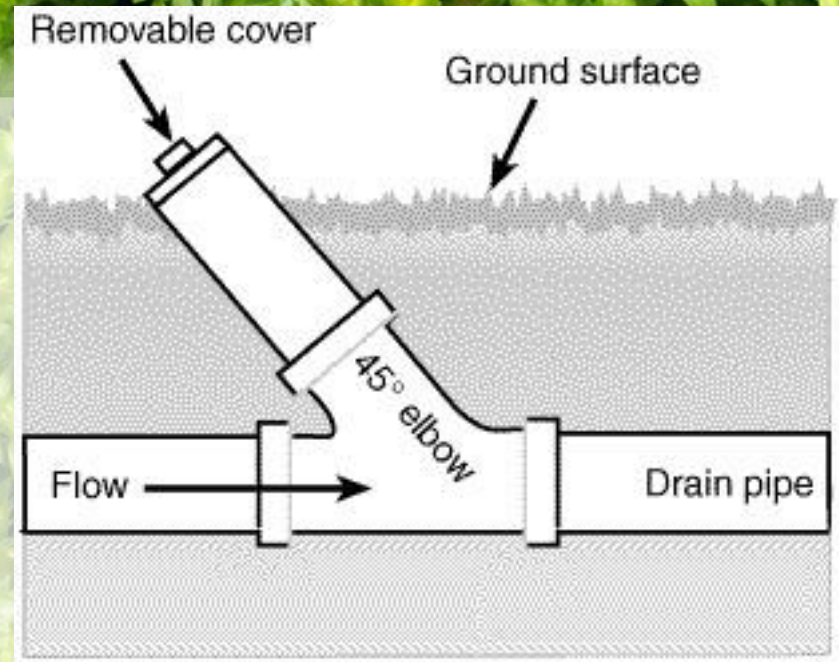
PIPE LAMPHOLE.



BRICK LAMPHOLE.

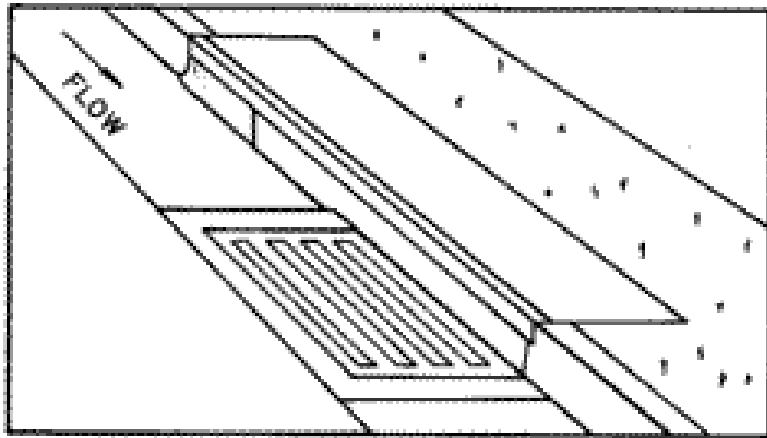
Clean Outs

- A clean out is an inclined pipe extending from the ground and connected to the under ground sewer.
- It is used for cleaning sewer pipes.

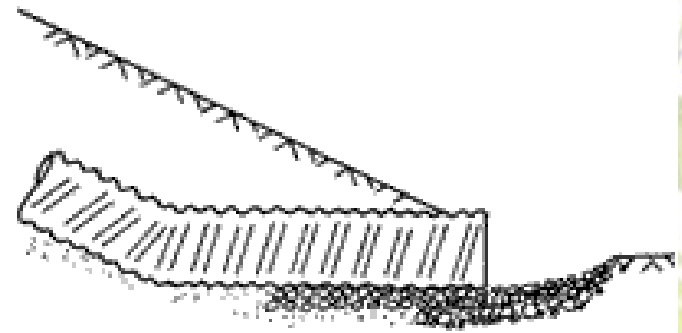
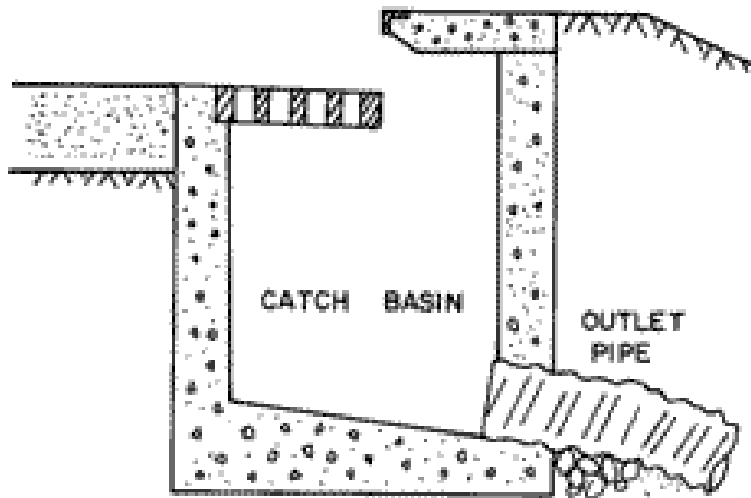


Street Inlets

- Inlets are openings on the road surface at the lowest point for draining rain water from the roads and admitting it into the under ground storm water sewers.
- There are two types of street inlets viz.
 - Vertical Inlet
 - Horizontal Inlet



Horizontal Inlet



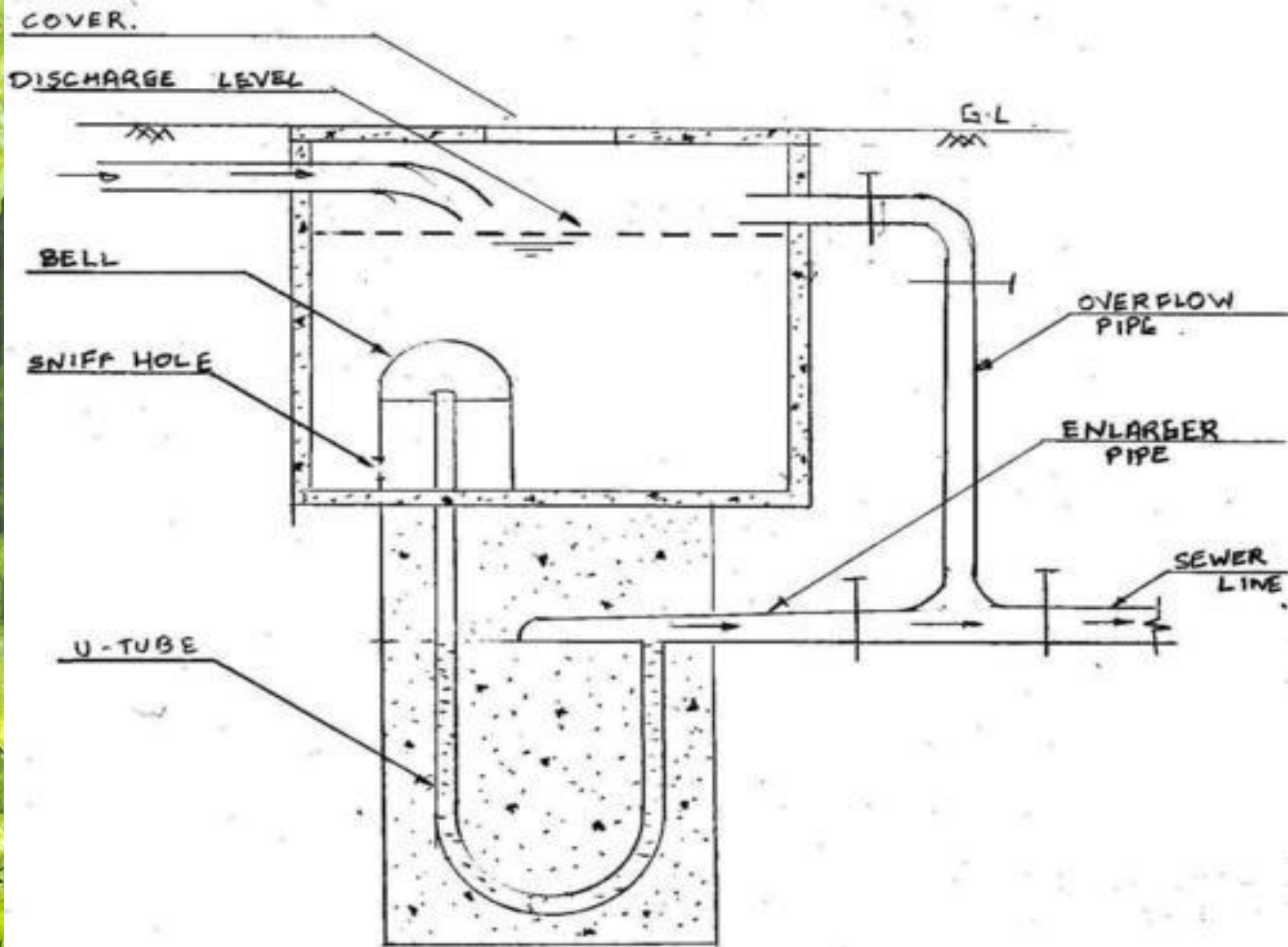


Flushing Tanks

- It is provided when there are chances of blockage.
- When the self cleansing velocity of the sewer is very less or when the pipe is laid straight.
- It is also placed at dead end points of sewer.
- These devices store water temporarily, and
- Throw it into the sewer for the purpose of flushing and cleaning the sewer.
- Types of flushing operations are
 - Automatic Flushing Tank
 - Hand Operated Flushing Tank

Automatic Flushing Tank

- The flushing operation is carried out automatic at regular intervals.
- The entry of water is so regulated as to fill the tank upto the discharge point in a period equal to the flushing interval.
- An overflow pipe is also provided to drain away water in case the tank fails to discharge and thereby overflow.



GREASE AND OIL TRAPS

- Grease and oil traps are those trap chambers which are constructed in a sewerage system to remove grease and oil from the sewage before it enters into the sewer line.
- Such traps are located near the sources contributing grease and oil to the sewage.

INLET WITH
GRATING

COVER

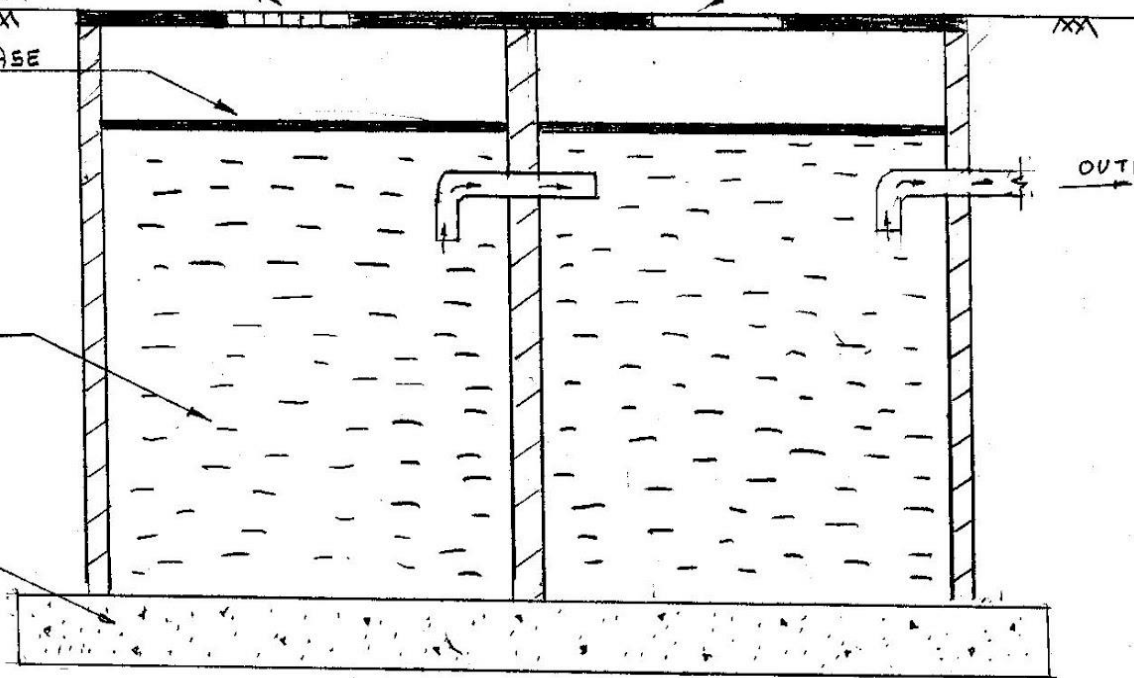
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OIL AND GREASE

OUTLET

SEWER

CONCRETE
BASE

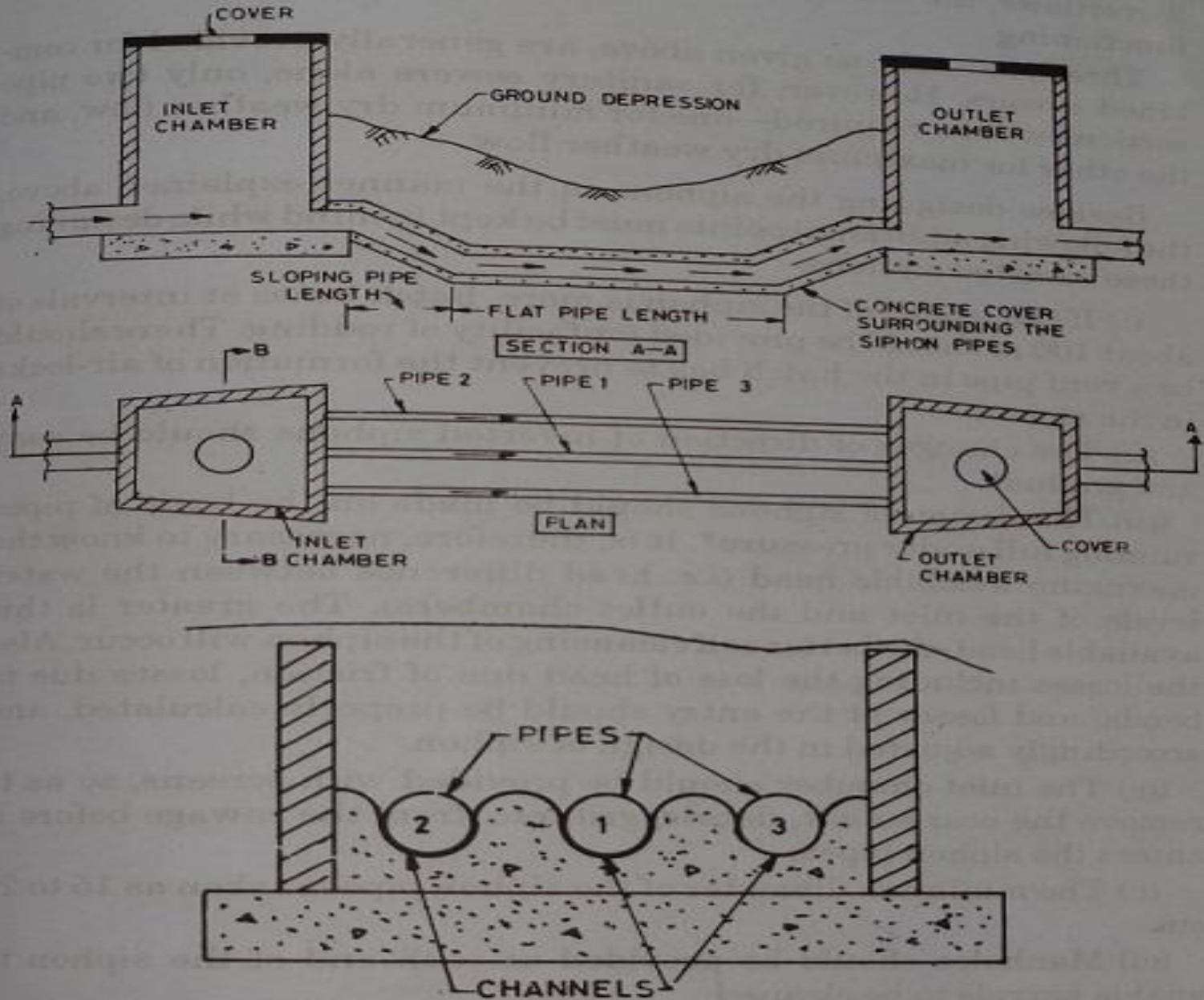


SAND, GREASE AND OIL TRAPS

- If sand is also desired to be excluded from the sewage, dead space should be kept at the bottom of the chamber for sand to be deposited.

INVERTED SIPHONS

- An inverted siphon is thus a sewer section constructed lower than the adjacent sewer sections and it runs full under gravity with pressure greater than the atmosphere.



Section B—B (on enlarged scale)
 Fig. 5.31. Inverted siphon.

STORM WATER REGULATOR

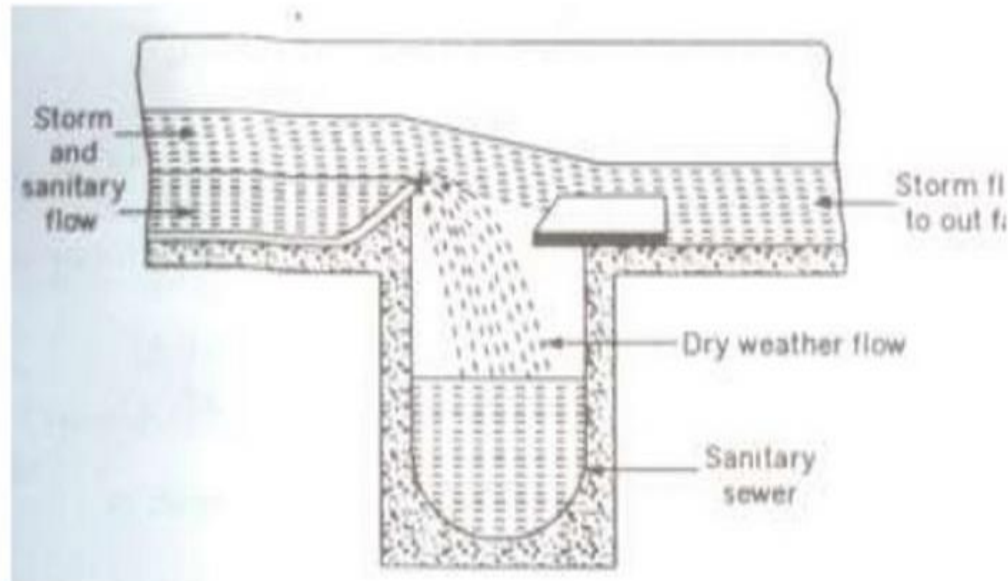
- They are constructed in the combined sewerage systems, and permit the diversion of excess storm water into a nearby stream.
- Storm water regulators may be of the following types:
 - Leaping Weir
 - Overflow Weir
 - Siphon Spillway

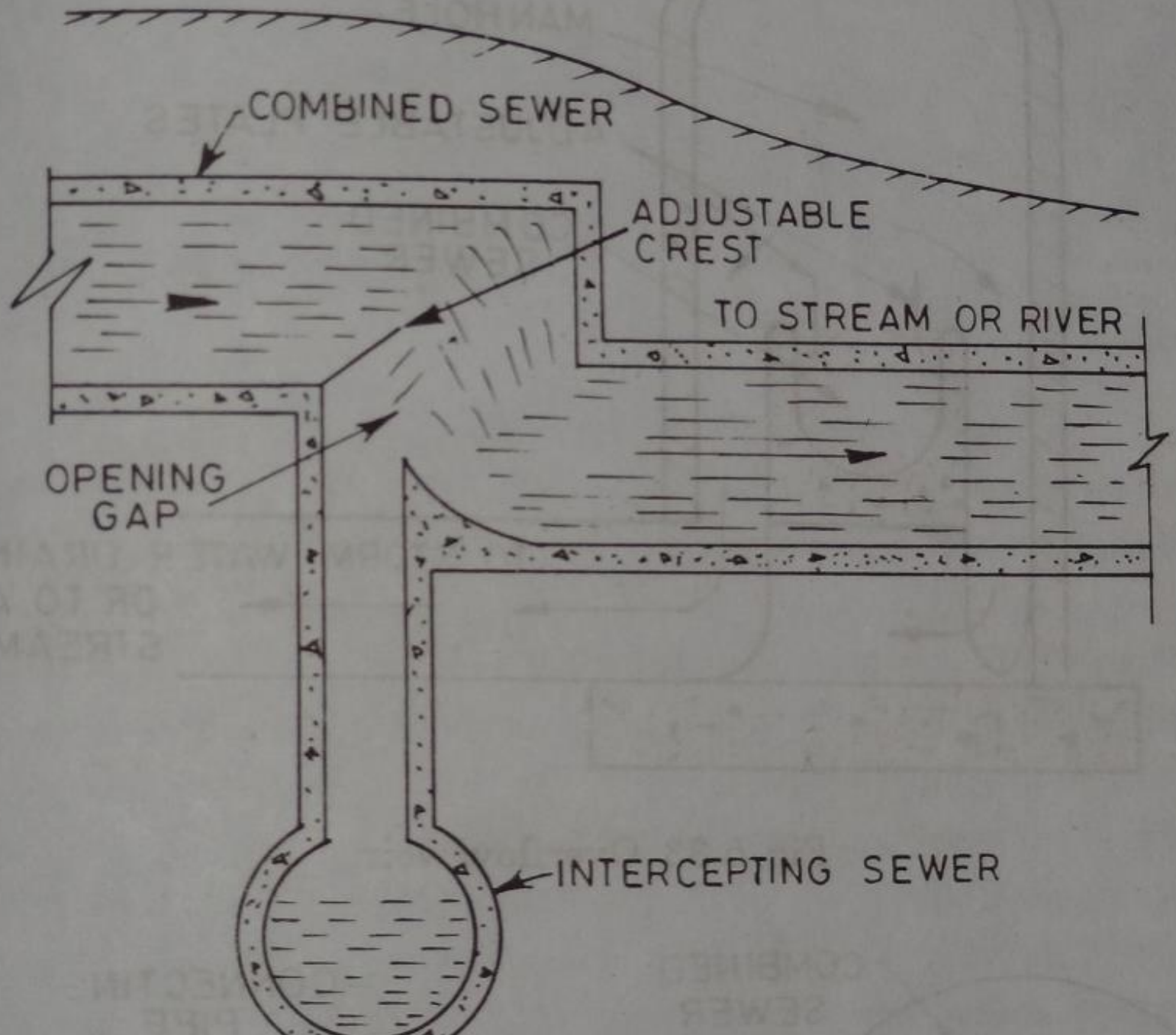
Leaping weir-

The term leaping weir is used to indicate the gap or opening in the invert of a combined sewer. The intercepting sewer runs at right angles to the combined sewers.

When the discharge is small, the sewage falls directly into the intercepting sewer through the opening. But when a discharge exceeds a certain limit, the excess sewage laps or jumps across the weir and it is carried to natural stream or river.

The leaping weir has no moving parts. A grating may be provided at the gap level to prevent the entry of small stones, debris etc. into the intercepting sewer.

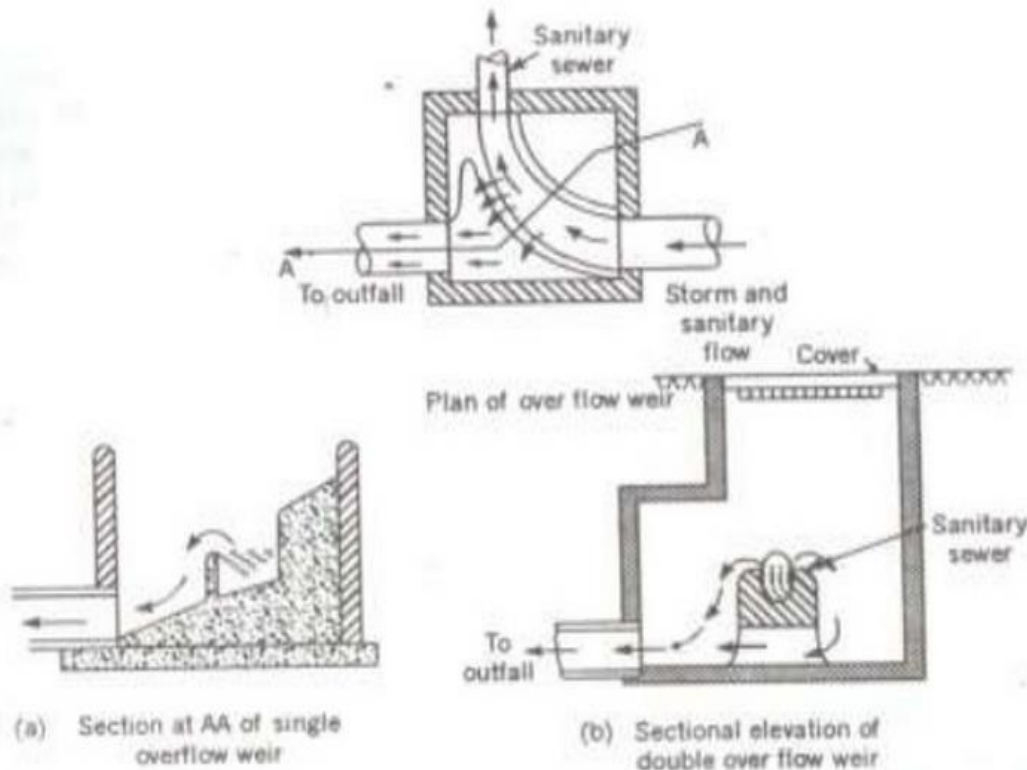




Overflow weir-

In this type of arrangement, the excess sewage is allowed to overflow in the channel made in the manhole.

When the quantity of sewage exceeds the capacity of the combined sewer, it overflows and falls into the channels and it is conveyed to the storm water sewer. In order to prevent the escape of floating matter from the combined sewer channel, the adjustable plates, are sometimes provided.



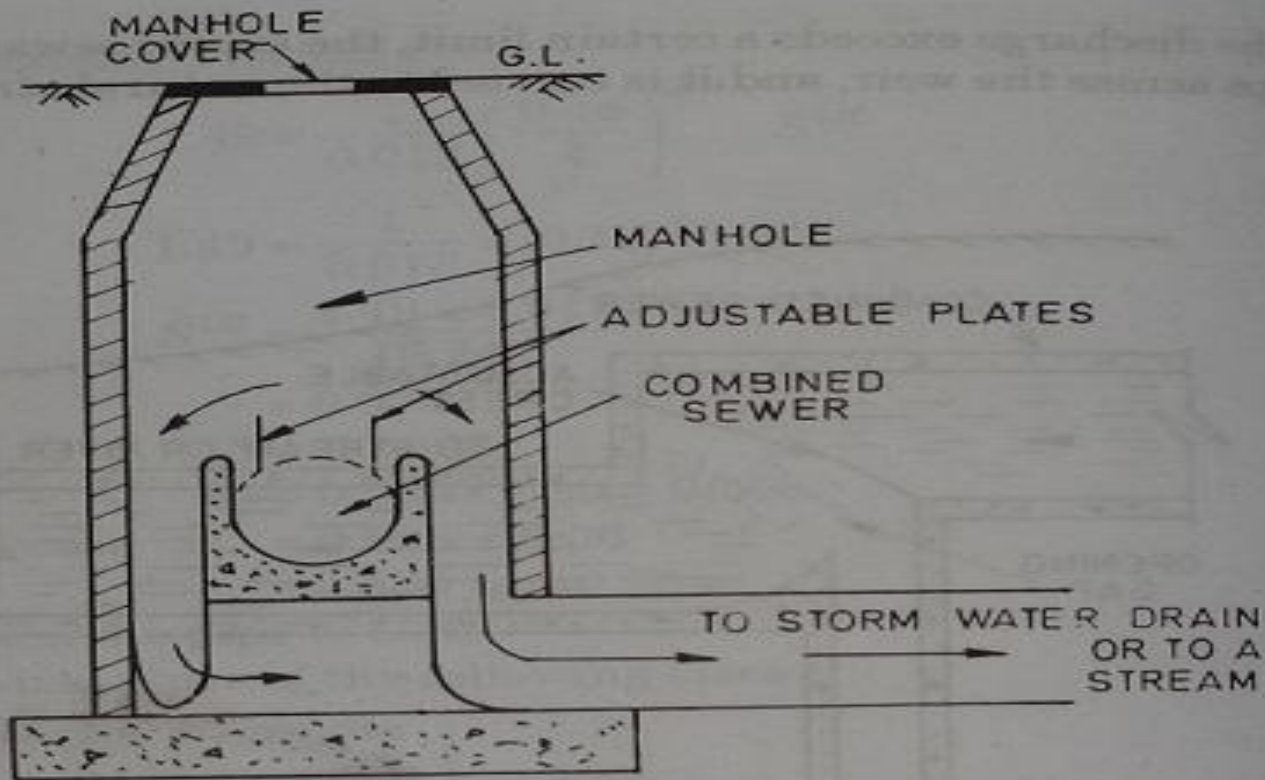


Fig. 5.33. Overflow weir.

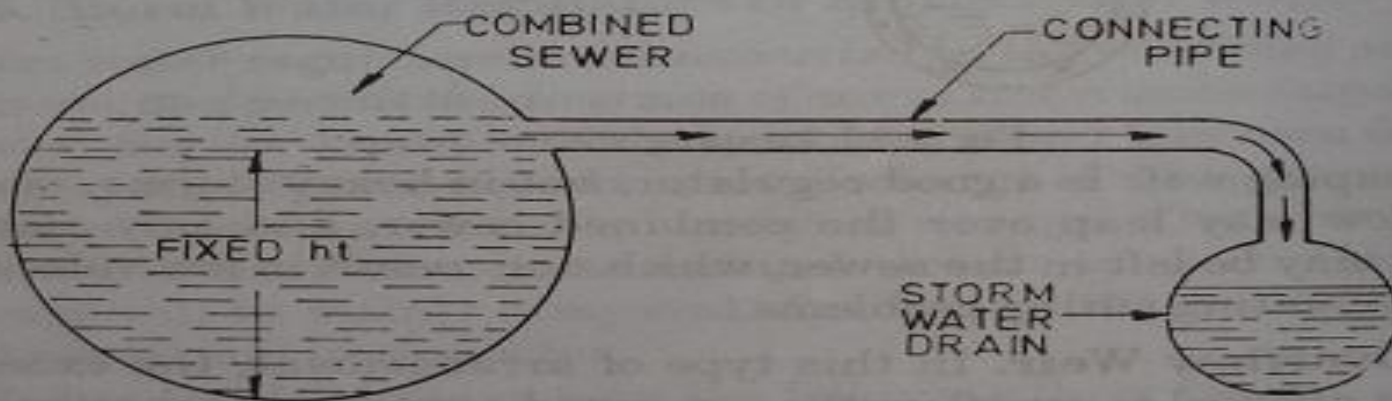
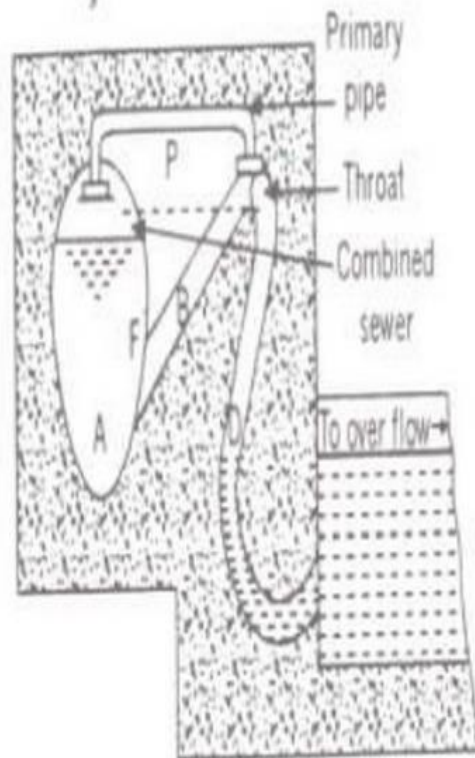


Fig. 5.34. Overflow weir (another type of arrangement).

Siphon spillway-

- This arrangement of diverting excess sewage from the combined sewer is the most effective because of following-
- It works on the principle of siphon action and it operates automatically. The rise of sewage in combined sewer is thus controlled in a better way.
- It is automatic in functioning and this is the most effective in all other methods.
- This arrangement has no moving parts and thus low maintenance. However it is likely to be clogged due to narrow passages.



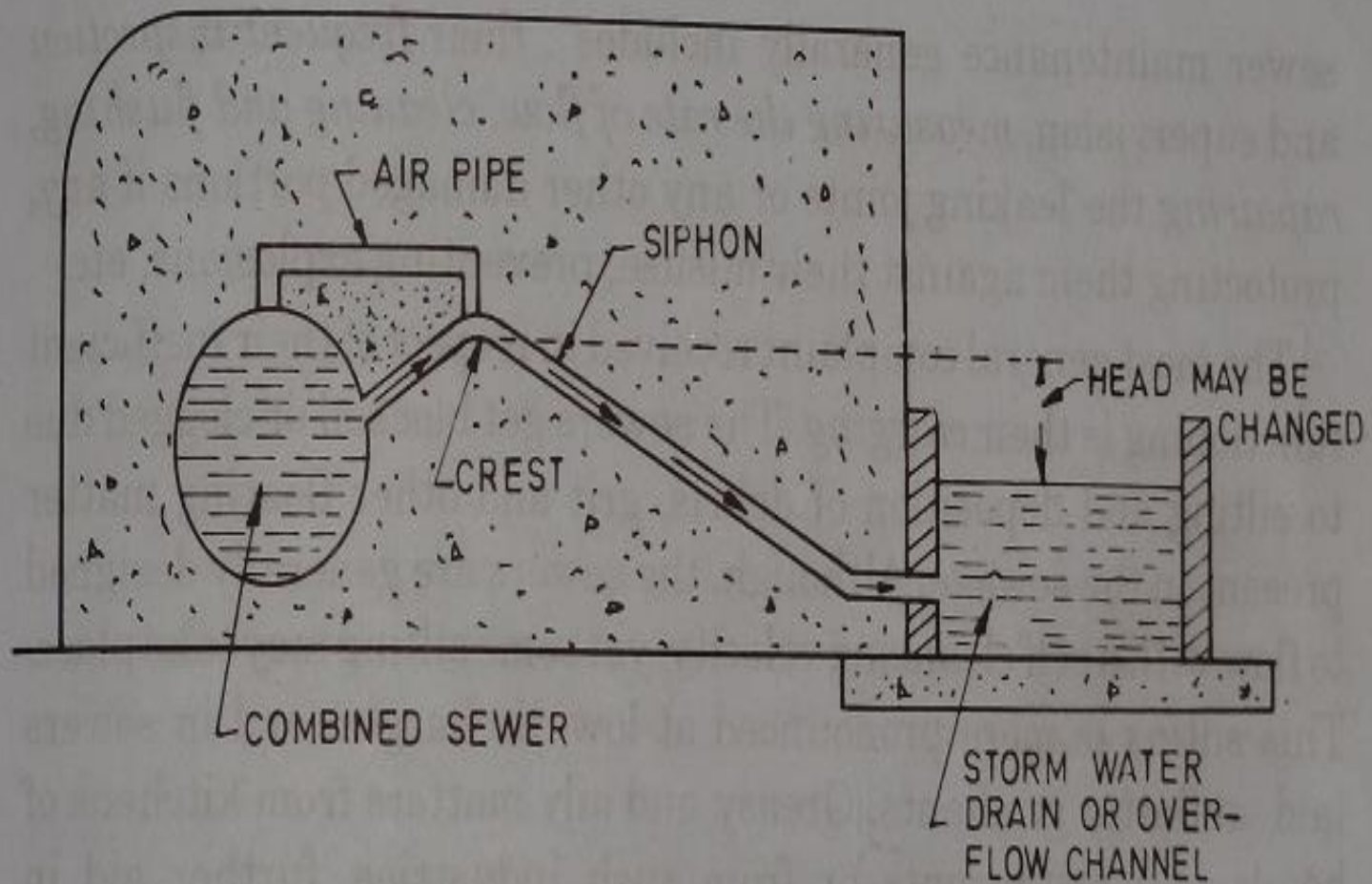


Fig. 5.35. Siphon spillway type of storm regulator.



THANK YOU

References

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- Punmia B. C. – Wastewater Engineering
- Google Images

Thank You

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