ROAD DRAINAGE → Chapte-5 →

* The term drainage is difended as the intersection and removal of water from over and under an area

* The highway drainage is the process of removal of excess water from road surface and also from subgrade.

Necesity and requirements of highway drainage →

* The surface water from the carraige way and the sholder should effectively be drained ~~up~~ off without using it to percolate to the subgrade.

* The surface water from the adjoining land should be prevented from entering the road way.

* The side drain should have sufficient capacity and longitudinal slopes to carry away all the surface water collected.

* Flow of surface water across road and sholder should not cause erosion.

* Seepage and other sources of under ground water should be drained out by the sub-surface drainage system.

* The highest level of ground water table should be kept well below the level of subgrade at least 1.2m.

Cross drainage work →

* When streams have to cross a road way facility for cross drainage work should be provided.

* The cross drainage work commonly in use are colverts and small bridges.

* When a small stream crosses a road with ~~waterway~~ width less than 6m the cross drainage structure provided is called culvert.

* If the span is greater than 6m, then it is called bridge.

* ~~The common tyl~~

The common types of culverts are →

(i) Slab Culvert →

* In this culvert RCC slab is placed over abutments made of masonary and the span is 3m.

(ii) Box culvert →

* It is a square or a rectangular shape is made up of RCC.

(iii) Arch ~~culvert~~ → culvert →

* It is generaly built using brick or stone masonary.

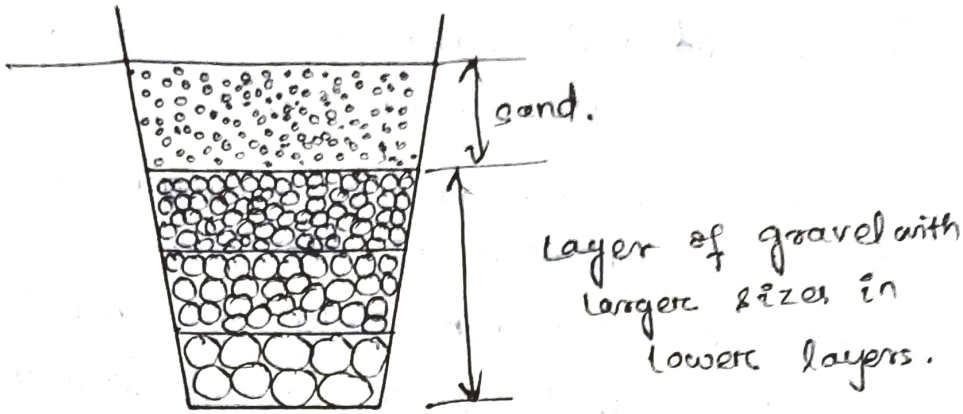
(iv) Pipe →

* Its minimum diameter of 75cm and is made up of steel or RCC.

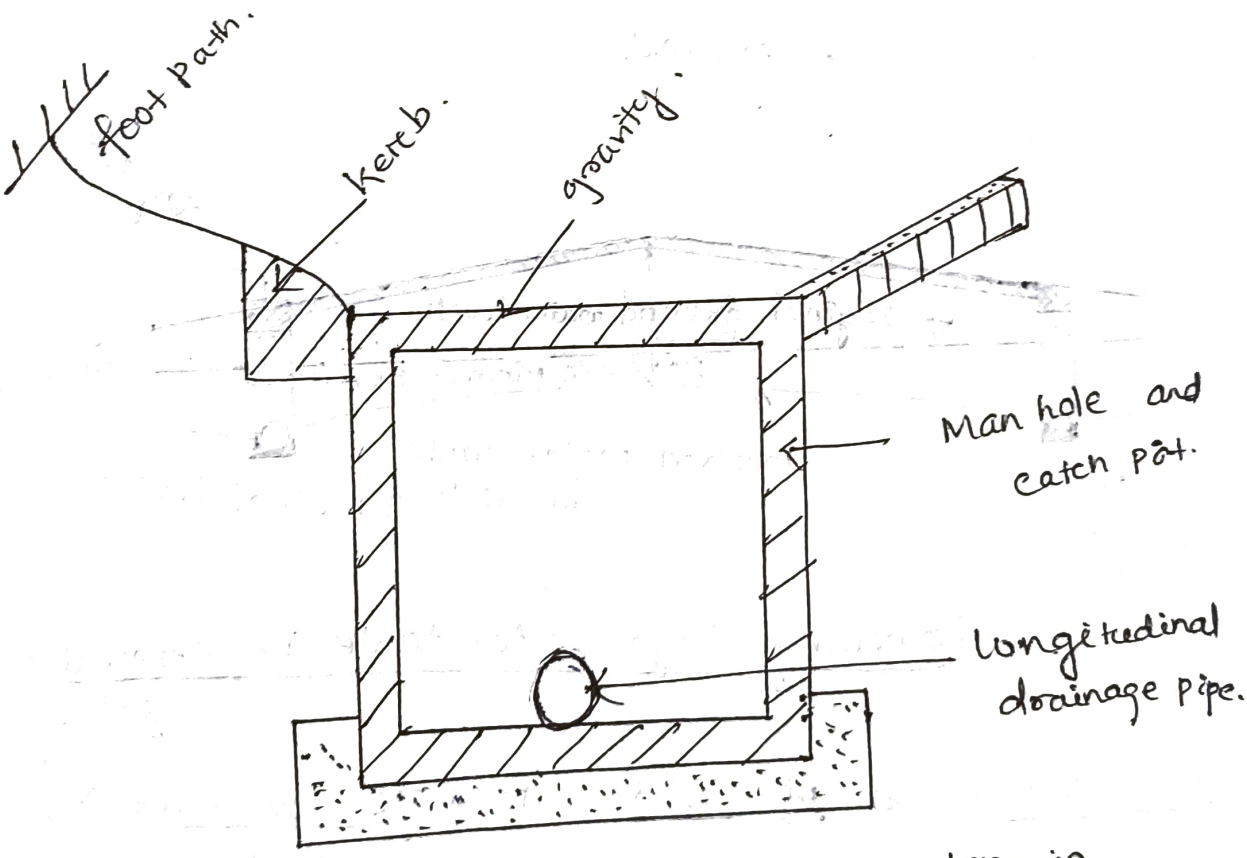
SURFACE DRAINAGE →

* The surface water is to be collected and disposed.
* The water is first collected in longitudinal drain and then the water is disposed off at the nearest valley or water course.

* The cross drainage work like culvert and small bridges may be necessary for the disposal of surface water from the road side drains.



Covered Drainage Trenches.



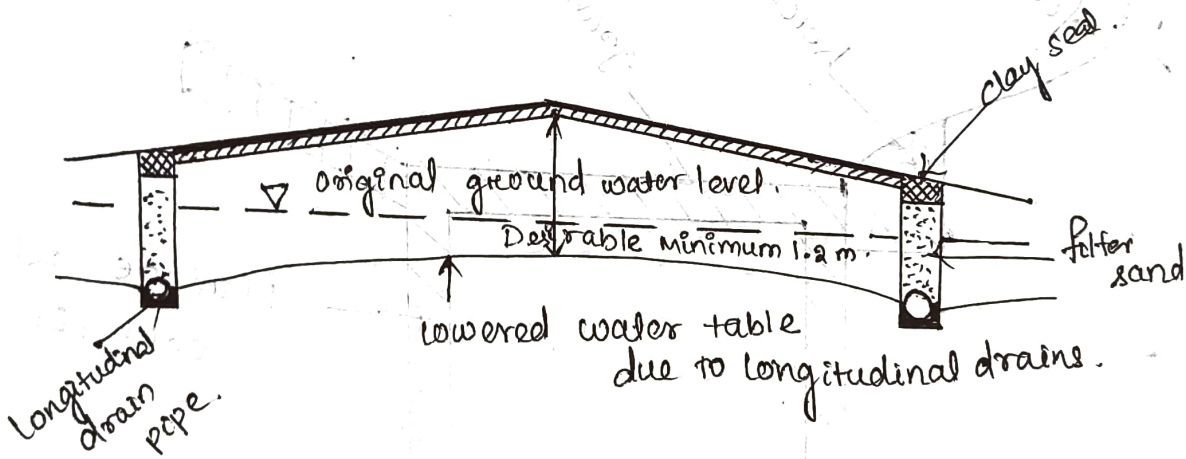
Surface drainage system in Urban roads.

SUB SURFACE DRAINAGE →.

* Changes in moisture content of subgrade are caused by fluctuation in ground water table seepage flow, Percolation of rain water and movement of capillary water and even water vapour.

* In subsurface drainage of highways it is attempted to keep the variation of moisture in subgrade soil to a minimum how ever only the gravitational water is drained by the usual drainage system.

* If the soil is relatively permeable it may be required to lower the high water table by construction of longitudinal drainage trenches with drain pipe and filter sand.



Lowering high water table in Permeable soils.

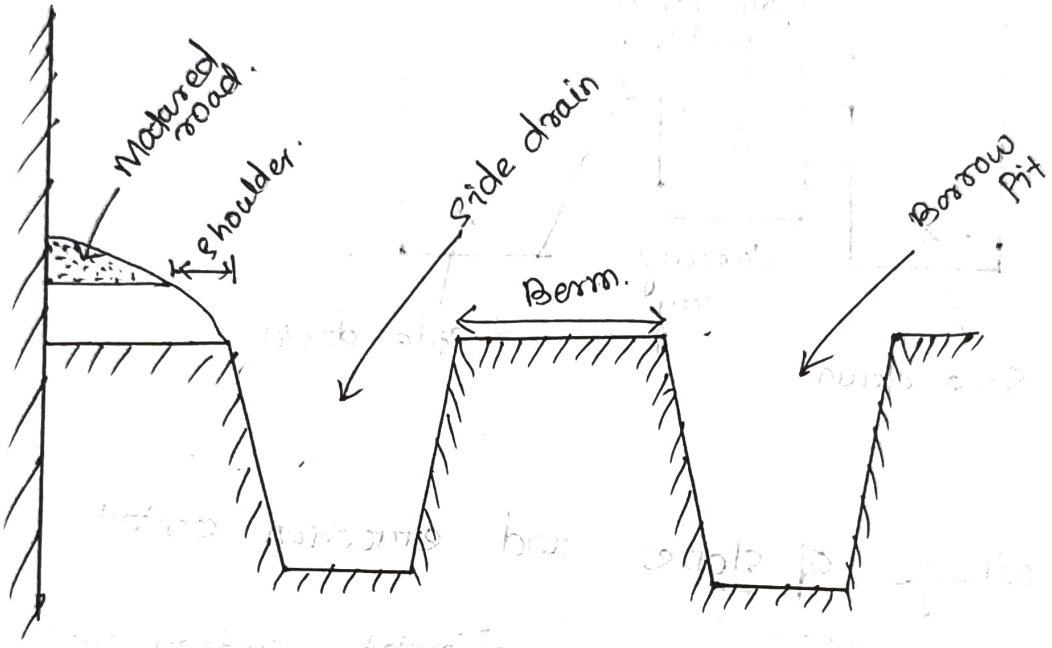
Typical cross section of side drainage for road in Embankment →

* for roads in embacment the side drains are Provided in one or both side of the road beyond the sholder.

* The side drains are provided / constructed at a minimum distance of about 2m from edge of embacment so that water cannot enter the earth work.

* The water flowing in the side drains can be then suitably disposed of without causing any harm to the road way.

Side drains for road in ~~embankment~~ cutting

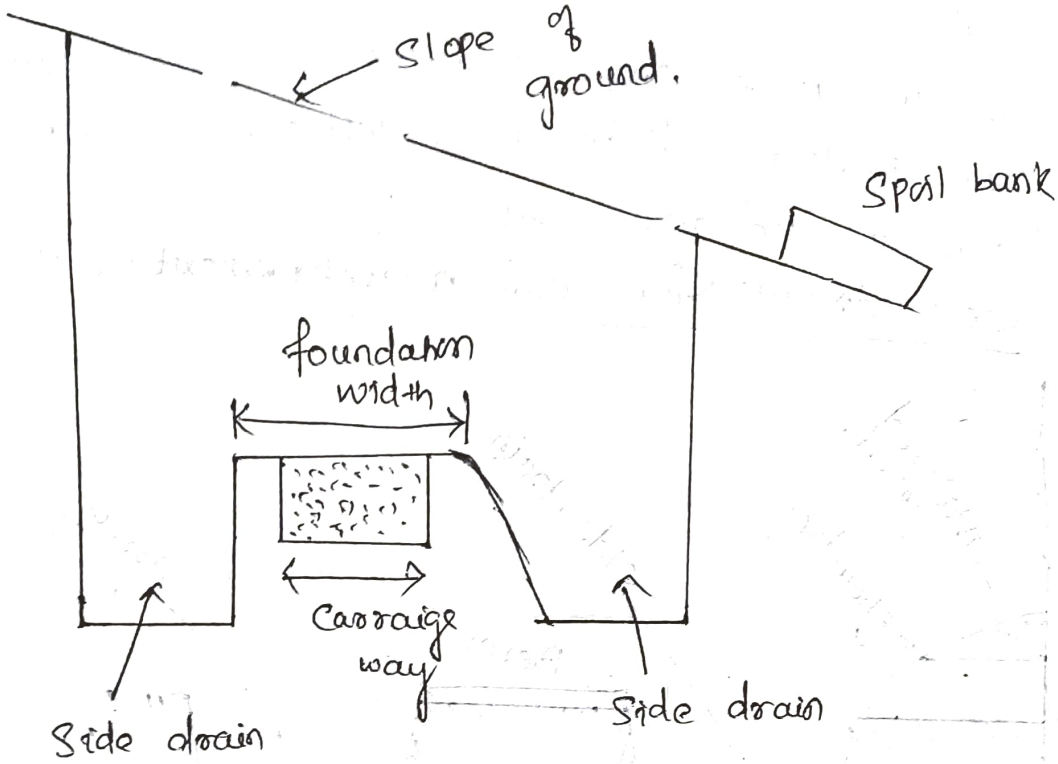


(Side drains for road in embakment).

* for roads in cutting the side drains are provided on either side of formation.

* The open deep side drains may proof to be dangerous where there is restriction of spaces.

* In such circumstances the covered drains or pipe drains are filled properly with suitable material like coarse sand and gravel may be provided.



* Drainage of slopes and erosion control

* drainage of slopes of embankment, cutting and while side are almost important to prevent in stability of slope and slides.
* An efficient network of surface drainage system consisting of intersepting drains and sloping drains to keep the slope properly drained is very useful for stability.
* The water from the slopping drains is collected from the catch pits and diverted across through the calvert at suitable interval.