**1 Pre-treatment 1**

Screen and metal grills or sieves trap floating & suspended items (e.g. plastic & paper).

Materials collected by screens are disposed of in landfill or incinerated.

**2 Pre-treatment 2**

Grit traps collect stones by widening the channel so flow rate drops and the stones fall to the bottom which is later scraped out.

**3 Pre-treatment 3**

Faecal solids may be chopped up to increase the surface area to speed up processes later on.

**4 Primary Treatment**

Effluent is held in sedimentation tanks so faecal solids sink to the bottom for removal later (95% of organic matter removed)

**5 Sludge disposal 1 (from primary treatment)**

Sludge is digested by anaerobic bacteria in warm digestion tanks for about 4 weeks.

Most pathogens are killed and odours are reduced.

Any remaining sludge is disposed of in landfill, incinerated (this can be expensive because of fuel needed) or dumped at sea (band in some countries)

**6 Sludge disposal 2**

Remaining sludge can be used in agriculture as a fertiliser but it may contain heavy metals which can be removed by adding lime which reduces the solubility of the heavy metals. Remaining pathogens are removed by heat treatment.

**7 Sludge disposal 3**

Gas is produced by anaerobic digestion produces methane which can be used as a fuel to heat the digester, nearby buildings or run converted diesel engines to generate electricity.

**8 Secondary treatment 1**

Aeration tanks: Remaining effluent is broken down by aerobic bacteria in tanks that mix air into them using large paddle wheels.

**9 Secondary treatment 2**

Secondary sedimentation tanks: Effluent from the aeration tanks are placed in secondary sedimentation tanks to allow suspended bacteria to collected. The bacteria can be re-used in the aeration tanks.

Clear effluent may be discharged into the river, lake or sea after secondary sedimentation tanks but this could lead to eutrophication is there are dissolved inorganic materials.

**10 Secondary treatment 3**

Tricking filter beds are an alternative to aeration tanks. Rotating arms spray the liquid effluent over lumps of gravel, coke or blast furnace clinker. These provide a surface for bacteria, fungi, algae and worms to digest remaining organic matter.

**11 Tertiary treatment**

Remaining bacteria is removed by passing the effluent through very fine sieves called micro-strainers or adding chlorine (sterilising chemical)

Phosphates can be removed by adding a solution of iron (III) sulfate which produces insoluble iron phosphate which is collected as fine sediment.