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Submitt To

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QNO-1
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Wastewater Engineering ::

Sanitary Engineering, also known as public health Engineering, is the application of Engineering Method to improve Sanitation of human Communities, Primarily by providing Removal and disposal of human waste, treatment and reuse application for various purposes

→ Waste water is directly related to improving Environment by disposing off treated wastewater and thus reducing the risk of ground water contamination and

Safeguarding aquatic life.

→ Water treatment is the process of making water suitable or acceptable for an end-use.

→ it removes existing water contaminants and so reduce their concentration that water become fit for its desired application.

QNO # 2

The Relationship of Waste Water Generation with Water Supply Locality is that;

⇒ Water supply is source of Water supply, transmission, distribution, and treatment of water. The term is used most frequently in regard to municipal water works, but applies also to water systems for industry irrigation, and other purposes.

Water obtained from subsurface surface sources, such as sands and gravels and porous or fractured rocks, is called ground water. Ground water flows toward points of discharge in river valleys and in some areas along seacoast. The flow take place in water bearing strata known as aquifers. In an unconfined stratum the water table

is the top or surface of the ground water. It may be within a few inches of ground surface or hundreds of feet below.

Wastewater is the combination of liquid and water-transported wastes from home, commercial buildings, industrial facilities, and institutions along with any groundwater infiltration and surface water stormwater inflow that may enter the sewer system.

Domestic wastewater is the spend water originating from all aspects of human sanitary water useage. It typically constitutes a combination of flows from kitchen, bathroom, and laundry, toilets, baths, kitchen sinks, garbage grinders, dishwashers, washing machine and water softners.

Domestic wastewater, is the name of implies, principally originate in residences and is also referred to as sanitary sewage. As such, commercial institutional and industrial establishment contribute a domestic wastewater component to the sewer system resulting from human sanitary activity.

⇒ If field measurement of waste water flow rate are not possible and actual waste water flow rate data are not available, water supply record can often be used to estimate waste water flow rate.

QNO-03

Importance of Wastewater

Characterization::

→ Wastewater characteristics, as well as water treatment processes, are important for environmental engineers to understand.

→ Analyzing the physical and chemical characteristics of wastewater treatment process. Our environmental review course greatly emphasizes wastewater treatment methods based on the physical and chemical characteristics of

the water.

→ It is important that those who are striving to obtain their certification fully understand how to regulate the biological characteristics of wastewater through appropriate treatment methods.

The Importance of waste water characterization has been explained in next page on basis of physical, chemical and biological ways:-

⇒ Physical characteristics of Wastewater:

Color :-

Fresh sewage is normally brown & yellowish in color but over time becomes black in color.

Odor :-

Wastewater that includes sewage typically develops a strong odor.

Temperature :-

Due to more biological activity, wastewater will have higher temperature.

Turbidity :-

Due to suspended solids in wastewater, wastewater will have a higher turbidity or cloudiness.

⇒ Chemical Characteristics of Wastewater:-

Wastwater contains different chemicals in various forms as mentioned below.

- Chemical Oxygen Demand (COD).
COD is a measure of organic materials in wastewater in terms of the oxygen required to oxidize the organic materials.
- Total Organic Carbon (TOC).
TOC is a measure of carbon with in organic materials.
- Nitrogen - organic nitrogen is the amount of nitrogen present in organic compound.
- Phosphorous - organic phosphorous (in protein) and inorganic

(phosphates - PO_4^-)

→ chlorides (Cl^-)

→ Sulfates (SO_4^{2-})

→ Heavy Metals

1 - Mercury (Hg)

2 - Arsenic (As)

3 - Lead (Pb)

4 - Zinc (Zn)

5 - Cadmium (Cd)

6 - Copper (Cu)

7 - Nickel (Ni)

8 - Chromium (Cr)

9 - Silver (Ag)

Biological characteristics of Wastewater:-

→ Biochemical Oxygen Demand
(BOD) - BOD is the
amount of oxygen needed

to stabilize organic matter using microorganisms.

→ Nitrogenous Oxygen Demand (NOD) - NOD is the amount of oxygen needed to convert organic and ammonia nitrogen into nitrates by nitrifying bacteria.

→ Microbial life in wastewater - wastewater contain following microbes:

- 1 - Bacteria
- 2 - Protozoa
- 3 - Fungi
- 4 - viruses
- 5 - Algae
- 6 - Rotifers
- 7 - Nematodes.

QNO # 4

Characteristics of Waste Water:-

⇒ Physical Characteristics:-

Turbidity, color, odor, total solid and Temperature.

⇒ Chemical Characteristics :-

Chemical oxygen demand (CoD), total organic carbon (Toc) Nitrogen, phosphorus, Chloride, Sulphates, Alkalinity, PH, heavy metal, traces, element and priority pollutants.

→ Biological Characteristics:-

Biochemical oxygen demand
Oxygen required for nitrification
and microbial population.



QNO5

⇒ Combined Sewerage System:

ADVANTAGES:-

- Both domestic sewage and storm water are carried in a single sewer so construction cost is less.
- The strength of domestic sewage is reduced because of dilution of storm water.
- The sewers are of large size and therefore the chances of their chocking are rare. it is easy to clean them.
- In town with narrow street the system is preferred.

⇒ DISADVANTAGES :-

- initial cost is high because of large dimension of sewer.
- Because of large size of sewer their handling and Transportation is difficult.
- Due to inclusion of storm water the load on treatment plant increases and ultimately increase treatment costs.
- During heavy rain the sewer may be overflow and may thus create Unhygienic condition.
- If the whole sewage is to be disposed off by pumping it is Uneconomical.

⇒ Separate Sewerage System:

ADVANTAGES :-

- Size of Sewer is generally less.
- Since the Sanitary Sewage and Storm water flow in a separate pipes, the quality of sewage to be treated is less.
- As the sewers are smaller in section, they can easily ventilated.
- Rain water can be discharge into stream or can be reused/ recycled with out any treatment.

DISADVANTAGES:-

- Since the Sewer are smaller in size, it is difficult to clean them.
- They are likely to get choked and blocked.
- initial cost is high, when two separate set are used.
- Maintenance cost of system is also high.

⇒ The Sewerage System that I recommend for New Proposed town is Combined Sewerage System because

→ For Narrow Street like town it is best system.

→ Cost is less, only initial cost is high it mean it is economical.

→ it easy to clean

→ The Sewers have large size So the chance of shocking / Blocking are rare.