Treatment Plant Layout and Siting
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- **Plant layout** is the arrangement of designed treatment units on the selected site. **Siting** is the selection of site for treatment plant based on features as character, topography, and shoreline. Site development should take the advantage of the existing site topography. The following principles are important to consider:
1- A site on a side-hill can facilitate gravity flow that will reduce pumping requirements and locate normal sequence of units without excessive excavation or fill.

2- When landscaping is utilized it should reflect the character of the surrounding area. Site development should alter existing naturally stabilized site contours and drainage as little as possible.

3- The developed site should be compatible with the existing land uses and the comprehensive development plan.
Treatment Plant Hydraulics

• *Hydraulic profile* is the graphical representation of the hydraulic grade line through the treatment plant. The head loss computations are started in the direction of flow using water surface in the influent of first treatment unit as the reference level.
• The **total available head** at the treatment plant is the difference in water surface elevations in the influent of first treatment unit and that in the effluent of last treatment unit. If the total available head is less than the head loss through the plant, flow by gravity cannot be achieved. In such cases pumping is needed to raise the head so that flow by gravity can occur.
• There are many basic principles that must be considered when preparing the hydraulic profile through the plant. Some are listed below:

1. The hydraulic profiles are prepared at peak and average design flows and at minimum initial flow.

2. The hydraulic profile is generally prepared for all main paths of flow through the plant.
3. The head loss through the treatment plant is the sum of head losses in the treatment units and the connecting piping and appurtenances.

4. The head losses through the treatment unit include the following:
   – Head losses at the influent structure.
   – Head losses at the effluent structure.
   – Head losses through the unit.
   – Miscellaneous and free fall surface allowance.
5. The total loss through the connecting pipings, channels and appurtenances is the sum of following:

- Head loss due to entrance.
- Head loss due to exit.
- Head loss due to contraction and enlargement.
- Head loss due to friction.
- Head loss due to bends, fittings, gates, valves, and meters.
- Head required over weir and other hydraulic controls.
- Free-fall surface allowance.