# Saint Louis County

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## PRESSURE DISTRIBUTION DESIGN

**Note: may use O.S.I. Pump Select software or equivalent in lieu of worksheet.**


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**System Designer _____**

Design a pressure distribution network for a soil absorption unit. The distribution network consists of 1) the laterals and manifold, 2) the force main, 3) the pump or siphon, 4) the pump or siphon chamber.

Use the following criteria in the design:

| | |
|---|---|
| Aggregate area width | _____ ft |
| Aggregate area length | _____ ft |
| Elevation difference from the off-float to distribution network | _____ ft |
| Force main length | _____ ft |

**A. Design the distribution network.**

**1. Evaluate the configuration of the network based on the aggregate area.**

**2. Determine the lateral length.**

3. **Select the perforation size and spacing.**

   a. **Perforation spacing**

   b. **Perforation size**

4. **Determine the lateral diameter.**

5. **Determine the number of perforations per lateral and number of perforations.**

6. **Determine the lateral discharge rate (LDR)**

7. **Determine the number of laterals.**

8. **Calculate the manifold size.**

9. **Determine network discharge rate (LDR)**

**10. Determine the Total Dynamic Head.**

**a. System head**

**b. Elevation head**

**c. Friction loss**

**d. Total dynamic head**

**11. Pump summary**

## B. Design the Force Main, Pressurization Unit, Dose Chambers and Controls.

**1. Definitions:**

a. The elevation head is the height that the effluent is lifted.

b. The force main head is the head loss in the force main for the given flow rate. Table A-2 gives the friction loss. You need to select a force main diameter.

c. The network head is calculated by $H = 1.3*(Q/(11.79*D^2))^2$. H is head in ft, Q is orifice flow rate in gpm, and D is orifice diameter in inches. The 1.3 is an adjustment factor for friction loss in laterals. For 3/16in diameter orifice the equation is $H = 1.3*(Q/0.4145)^2$.

d. The total head is the sum of the elevation, force main and network heads.

2. **Determine the force main diameter.**

3. **Select the pressurization unit.**

4. **Determine the dose volume.**

5. **Size the dose chamber.**

6. **Select the controls and alarm.**

7. **Select effluent filter for septic tank/pump chamber.**