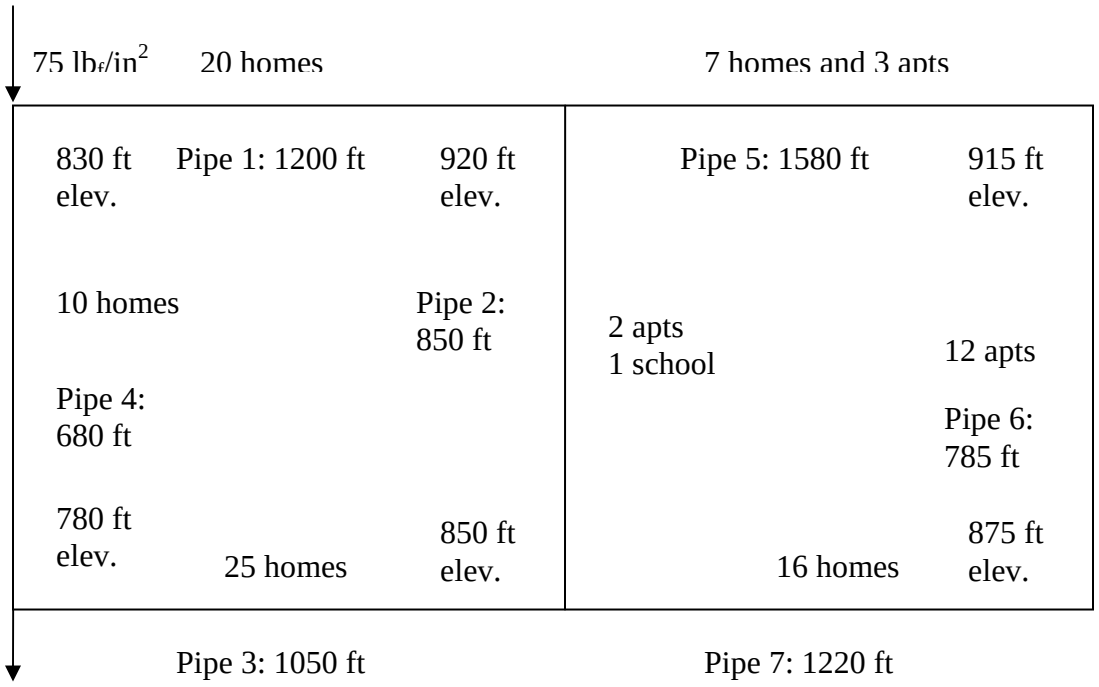
Module 4
In-Class Design of a Water Distribution System



Conservation Design
Home: 2,000 ft^2, ordinary construction, 2.4 people, 0.7 cats, 0.3 dogs…. (assume 38.9 gal/person/day for the average per capita water use rate)

Apt: quadplexes (each of 4 units: 1,200 ft^2, ordinary construction, 2 stories, 1.7 people, and no pets) (assume 33.3 gal/person/day for the average per capita water use rate)

School: 450 pupils, 15,000 ft^2, fire-resistant construction (assume 12.3 gal/student/day for the average per capita water use rate)

Design a water distribution system (considering fire flows) for the above site. Make (and state) necessary assumptions (pipe type and roughness, unit water use, minimum pipe size, etc.). Assume a water inflow rate that is about twice the calculated peak water demand. For the fire demand, assume the worst single fire. Do the calculations in the following major steps:

1) calculate water use (with fire demand) for each pipe length.
2) assume internally consistent distribution of flow for each node
3) calculate initial estimate of pipe diameter (using 3 ft/sec velocity)
4) do Hardy-Cross calculations to determine actual flows in each pipe
5) calculate pressure at each node
6) evaluate the results