CE 3372 – Water Systems Design
Demand Estimation
Exercise Set 3

Exercise

1. Figure 1 is a skeletonized layout for a network model of the water distribution system. Each small black circle is a distribution node that serves several lots. Each red circle represents a fire-hydrant location. Water is supplied by the lift station depicted in the lower left corner of the drawing.

   a) Estimate the average daily demand (ADD) for the entire distribution system using San Marcos, Texas water system design guidelines.

   b) Estimate the maximum daily demand (MDD) for the entire distribution system using San Marcos, Texas water system design guidelines.

   c) Estimate the maximum daily demand (MDD) + fire flow for the entire distribution system using San Marcos, Texas water system design guidelines.

   d) Estimate the peak hourly demand (PHD) for the entire distribution system using San Marcos, Texas water system design guidelines.

   e) Estimate the average daily demand (ADD) for the entire distribution system using Riverside County, CA. water system design guidelines.

   f) Estimate the maximum daily demand (MDD) for the entire distribution system using Riverside County, CA. water system design guidelines.

   g) Estimate the maximum daily demand (MDD) + fire flow for the entire distribution system using Riverside County, CA. water system design guidelines.

   h) Estimate the peak hourly demand (PHD) for the entire distribution system using Riverside County, CA. water system design guidelines.
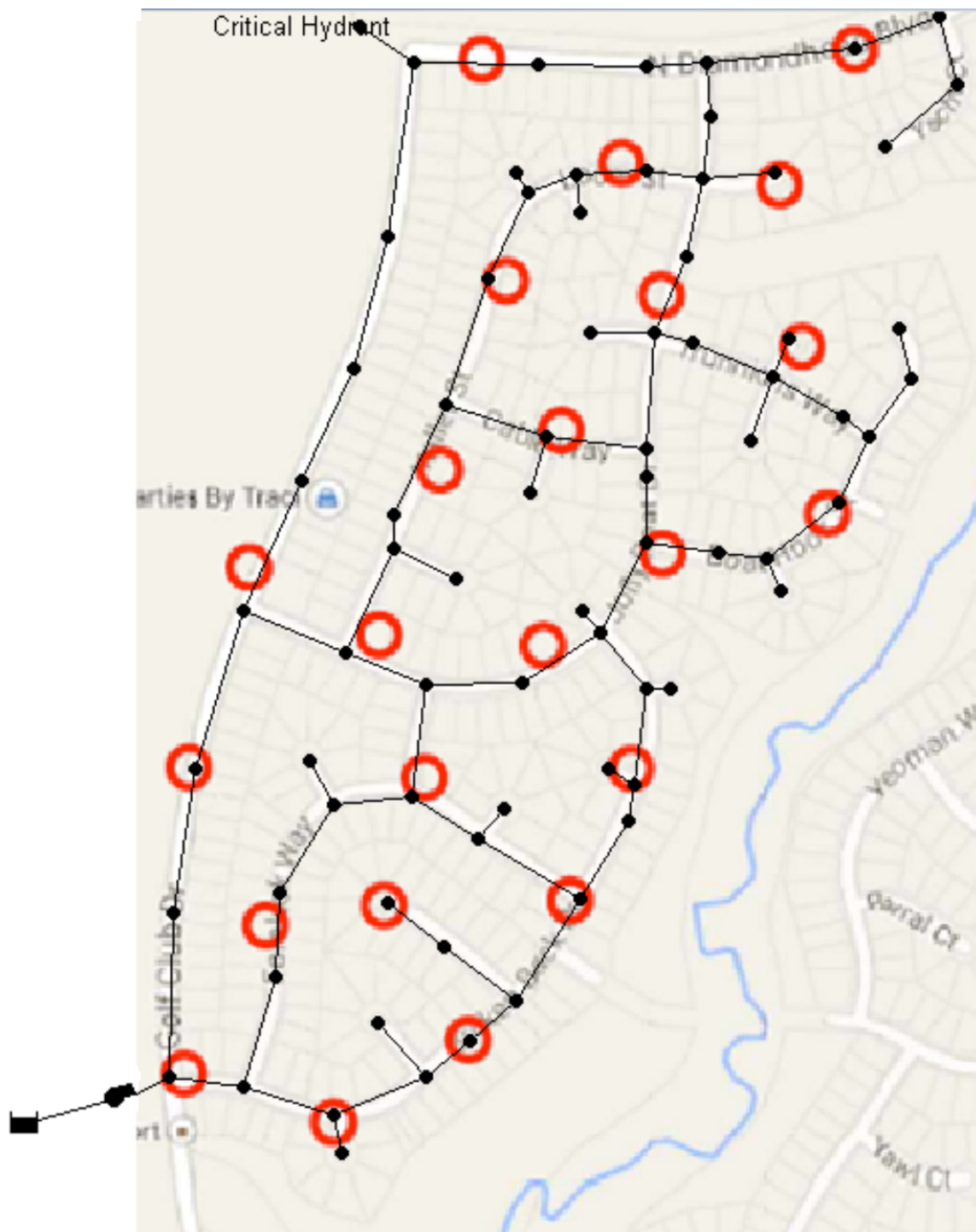
Figure 1: Newport Subdivision EPANET Model Pipe Layout

2. Figure 2 is a layout of a water distribution system for the subdivision. The blue line segments are pipes and are labeled (P1, P2, . . .). The blue circles are nodes and are labeled (N1, N2, . . .). The yellow polygons represent the demand lots assigned to each node. For example, node N2 supplies the six (6) individual lots located near the node.
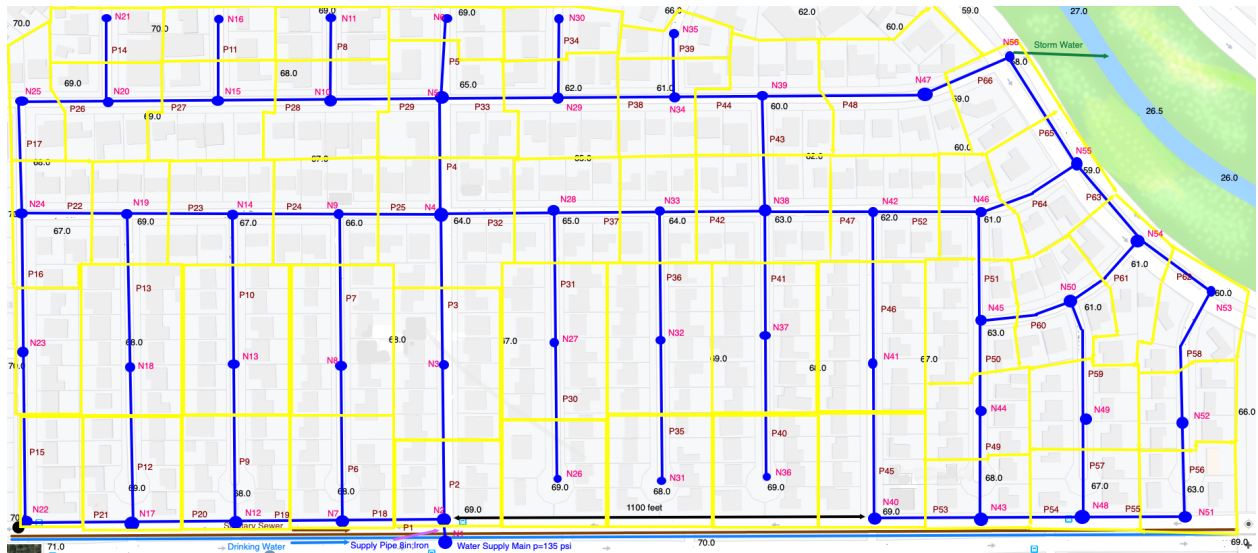

Figure 2: Water Distribution (Skeleton) System.

a) Determine the number of lots served by each node, these will constitute the by-node service unit equivalent (SUE).

b) Estimate the average daily demand (ADD), by-node, for distribution system using San Marcos, Texas water system design guidelines.

c) Estimate the maximum daily demand (MDD), by-node, for the distribution system using San Marcos, Texas water system design guidelines.

d) Estimate the maximum daily demand (MDD) + fire flow, by-node for the distribution system using San Marcos, Texas water system design guidelines.

e) Estimate the peak hourly demand (PHD), by-node, for the distribution system using San Marcos, Texas water system design guidelines.

Use your estimates to produce a completed version of Table 1. Save the table (in Excel or something similar) – you will need it later in the design project RP-1.

Table 1: Node Demands for Somewhere USA Distribution System

Node ID	SUE	ADD	MDD	MDD+Fire	PHD
N1	0	0	0	0	0
N2	6	...	...	...	...
N3	11	...	...	...	...
N4	...	...	...	...	...
N5	...	...	...	...	...
N6	...	...	...	...	...
N7	...	...	...	...	...
N8	...	...	...	...	...
N9	...	...	...	...	...
N10	...	...	...	...	...
N11	...	...	...	...	...
N12	...	...	...	...	...
N13	...	...	...	...	...
N14	...	...	...	...	...
N15	...	...	...	...	...
...	...	...	...	...	...
...	...	...	...	...	...
...	...	...	...	...	...
N47	...	...	...	...	...
N48	...	...	...	...	...
N49	...	...	...	...	...
N50	...	...	...	...	...
N51	...	...	...	...	...
N52	...	...	...	...	...
N53	...	...	...	...	...
N54	...	...	...	...	...
N55	...	...	...	...	...
N56	...	...	...	...	...