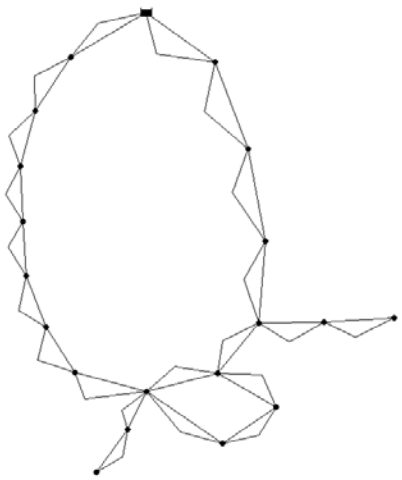
SYSTEM ID: Modified New York Tunnels System

NARRATIVE DESCRIPTION

The New York Tunnels system of the previous case modified to include chlorine concentrations. The minimum required chlorine concentration was assumed to be 0.3 mg/L and the chlorine dosing just downstream of the reservoir could be set to lie between 0.5 and 2.5 mg/L. The average daily demand was 1305 million gallons as in the original New York Tunnels problem (above).

NETWORK SCHEMATIC:



HISTORY OF THE NETWORK FILE

The modified network was first developed by Broad et al (2005) and has been subsequently optimized by Bi and Dandy (2014) and Broad et al (2015).

Bi and Dandy (2014) also developed a dynamic form of the network in which hourly demand multipliers were added to enable a 24 hour extended period simulation to be undertaken. The average daily demand of the system was reduced from 1305 million gallons to 961.58 million gallons, although the peak hourly demands match those in the original New York Tunnels problem.

AVAILABLE INFORMATION

Physical attributes	Yes
Schematic diagram	Yes
Network geometry data	Yes
GIS data file	No
Background map	No
Elevation data	Yes
Pipe data	Yes
Pipe material	No
Pipe age	No
Pipe pressure class	No
Nominal or actual diameters	Actual
Pump data	N.A.
Useful horsepower	
Pump operating curves	
Tank data	N.A.
Elevation data	
Stage storage curves	
Water quality information	
Valve data	N.A.
PRV/FCV data	
Isolation valve data	
Hydrant data	
Demand data	Yes
Total system demand	Yes
Nodal demand data	Yes
Temporal data demands	No
System leakage	No
Hydraulic data	Yes
Hydraulically calibrated model	
Field hydraulic calibration data	
Water quality data	Yes
Disinfection method	Yes
Chlorine residual data	No
Booster station data	No
Fluoride/Chloride field data	No
Water quality calibrated model	No
Operational data	No
SCADA datasets	No
Operational rules	No

REFERENCES:

Bi, W. and Dandy, G.C. (2014) Optimization of Water Distribution Systems Using Online Retrained Metamodels, J of Water Resources Plan. and Man., ASCE, 140 (11)

Broad, D.R., Dandy, G.C. and Maier, H.R. (2005) Water Distribution System Optimization using Metamodels, J of Water Resources Plan. and Man., ASCE, 131 (3), 172-180

Broad, D.R., Dandy, G.C. and Maier H.R. (2015) A Systematic Approach to Determining Metamodel Scope for Risk Based Optimization and its Application To Water Distribution System Design, Environmental Modelling and Software, 69, 382-395.

DETAILED DATA SUMMARIES

PHYSICAL ASSETS:

Asset Type:	# of Assets
Master Meters	0
Tanks	0
Pumps	0
Pump Stations	0
Water Treatment Plants	0

NETWORK CHARACTERISTICS:

# Total Pipes:	21
# Branch Pipes:	4
Ratio (Branch Pipes / Total Pipes):	0.19
# Nodes	20
# Reservoirs	1
# Tanks	0
# Regulating Valves	Unknown
# Isolation Values	Unknown
# Hydrants	Unknown
Elevation Data	YES

TUNNEL DATA:

Diameter (in)	Length (ft)
60	76,800
72	84,000
132	22,100
180	84,300

204	98,000

PUMP DATA:

Pump Horsepower	NO
Pump Curves:	NO

DEMAND STATISTICS:

Demographic Type	Population	Households
Directly Serviceable:	Unknown	Unknown
Indirectly Serviceable:	Unknown	Unknown
Total Serviceable:	Unknown	Unknown

Production Statistics	
Total Annual Volume Produced (MG):	1305
Total Annual Volume Purchased (MG):	1305
Total Annual Volume Provided (MG):	1305
Estimated Annual Water Loss:	Unknown

Water Costs	
Customer Type	Cost per 1000 gallons
Customers within the municipality	Unknown
Customers outside the municipality	Unknown

CUSTOMERS AND USAGE:

Customer Type	Customer Count	Average Daily Demand (MGD)
Wholesale:		
Residential:		
Commercial:		
Institutional:		
Industrial:		
Other:		
Total Customers:		
Flushing, Maintenance & Fire Protection:		
Total Water Usage:		1305

DATA FILE ATTRIBUTES:

ATTRIBUTE		UNITS
Pipe Length & Diameter	X	Feet, inches
Pipe Age		Yr. Installed
Node Elevation	X	Feet
Node Demand	X	GPM
Valves		
Hydrants		
Tank Levels		
Tank Volume		
PRVs		
WTP		
WTP Capacity		
Pump Data		