



2016

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PENN STATER HOTEL + CONFERENCE CENTER STATE COLLEGE, PA

MARCH 29 - APRIL 1

Schedule at <http://mobile.prwa.com>



Welcome!

Water Quality in Water Distribution Systems

We're Glad You're Here!

Please put cell phones on vibrate
during sessions, and take calls outside.

Water Quality in Water Distribution Systems

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Recent Regulatory Drivers

- Disinfection Byproducts Rule
- Revised Total Coliform Rule
- Flint Michigan – more to come
- Avoid taste and odor complaints



Water Quality in Storage Tanks

- Mixers
- Daily Water Turnover
- Keeping tanks full?
- May not be so good.



Tank Mixers



Passive



Active

Daily Turnover

Is there really enough water?

Shady Rest, PA

- 2,500 connections
- Average Day Demand (ADD) / connection
= 2.3 persons/connection x 75 gpd/person
= 173 gpd/connection
- Add 15% for UFW
= 198 gpd/connection, say 200 gpd/connection
- Add for Community
= 2,500 connections x 200 gpd/connection
= 500,000 gpd
- Obviously simplified.
- No commercial and industrial water use.



Calculate Storage Volume

Total Volume

= Emergency Volume + Equalization Volume + Fire Storage

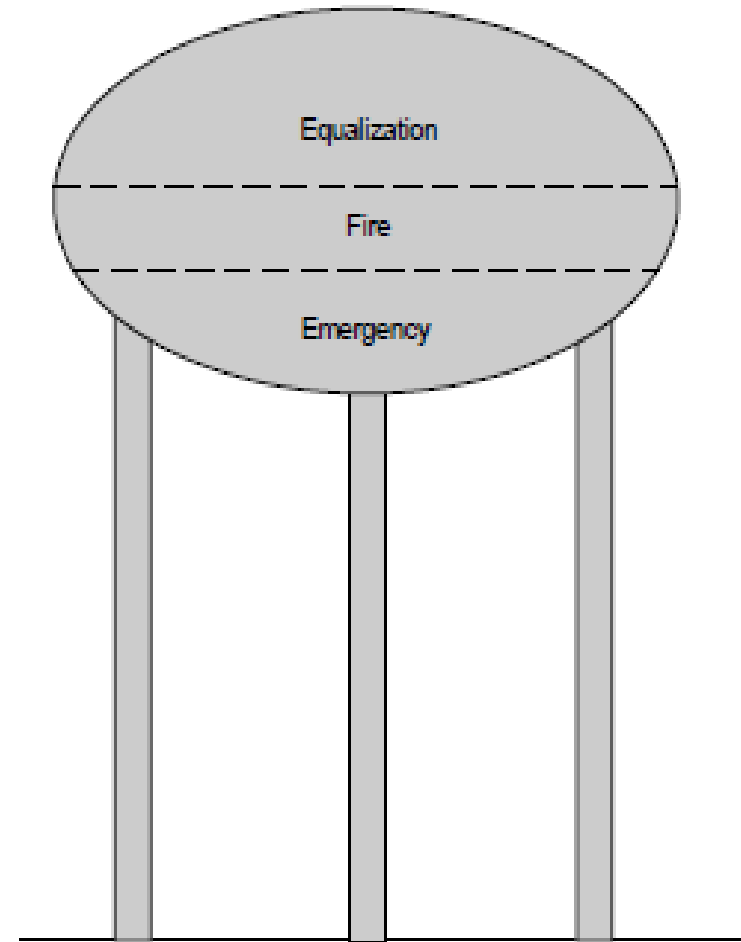
- Emergency Volume (PADEP)
= 1 day of ADD = 500,000 gallons
- Equalization Volume
= 25% to 35% of ADD = 150,000 gallons
- Fire Storage (default)
= 1,500 gpm x 2 hours x 60 minutes = 180,000 gallons
(ISO guidelines for commercial & industrial fire storage protection)

Total Storage = 830,000 gallons, say 900,000 gallons to 1 MG



Storage Tank Volume

- If at the bottom of EQ Storage... and water supply goes down... still have water to fight a fire.
- Water supplies typically kick on when the tank level is down.
- PADEP now monitors water age on new storage tank permits.
- And yes, you **CAN** have too much storage.



Water Quality in Distribution Systems

- Cleaning and Lining
- Unidirectional Flushing Program



Pipeline Cleaning and Lining



Pigs



Hydraulic



Dragline

Pipe 80+ years old?

May not be worth investment to clean and line it.

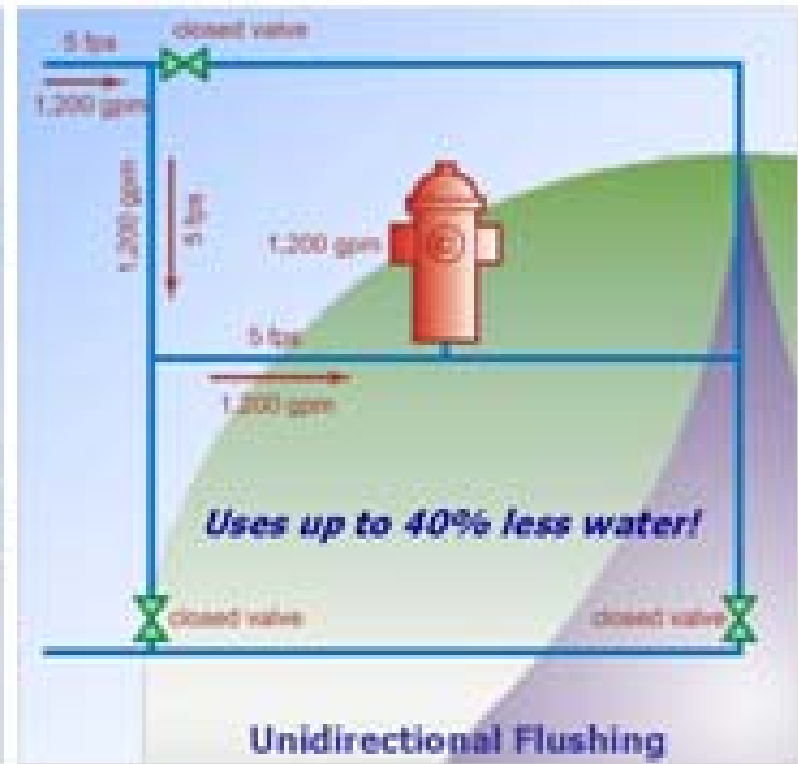
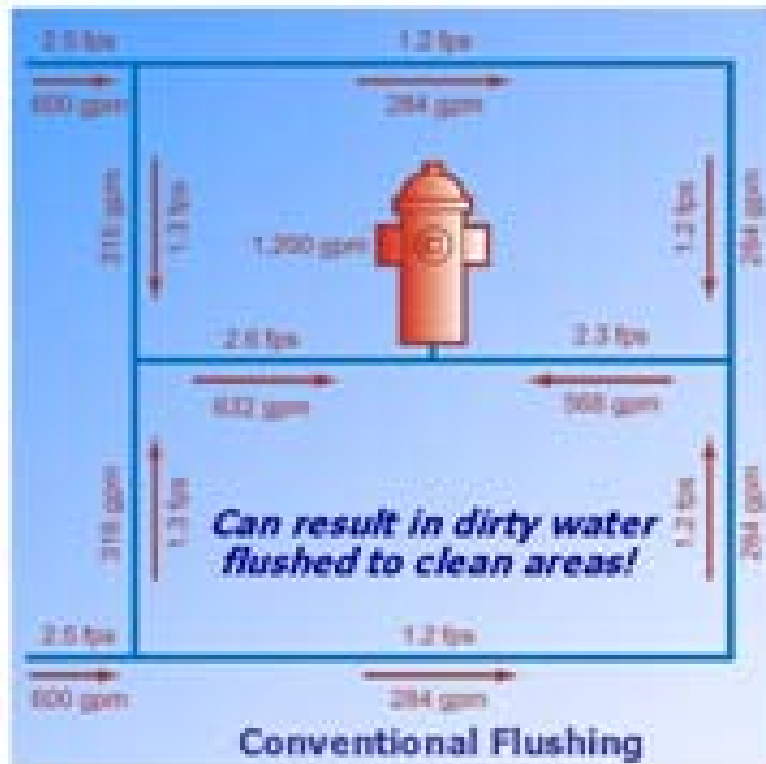
Replace it.







Unidirectional Flushing



Unidirectional Flushing

Target Velocity

5 to 10 fps, say 7 fps

6-inch: 650 gpm

8-inch: 1,100 gpm

12-inch: 2,500 gpd (multiple hydrants?)



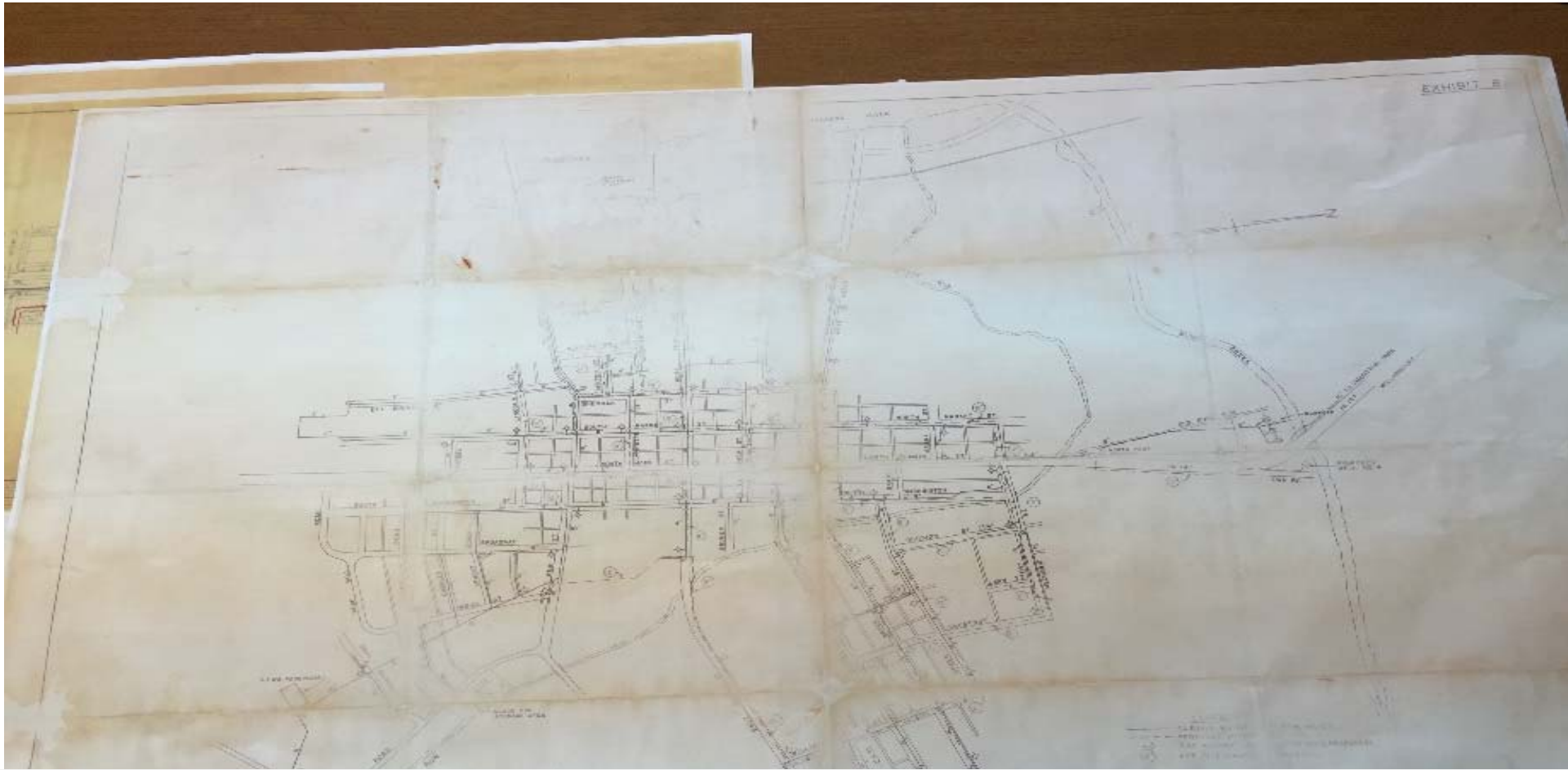
Unidirectional Flushing



What do you need?

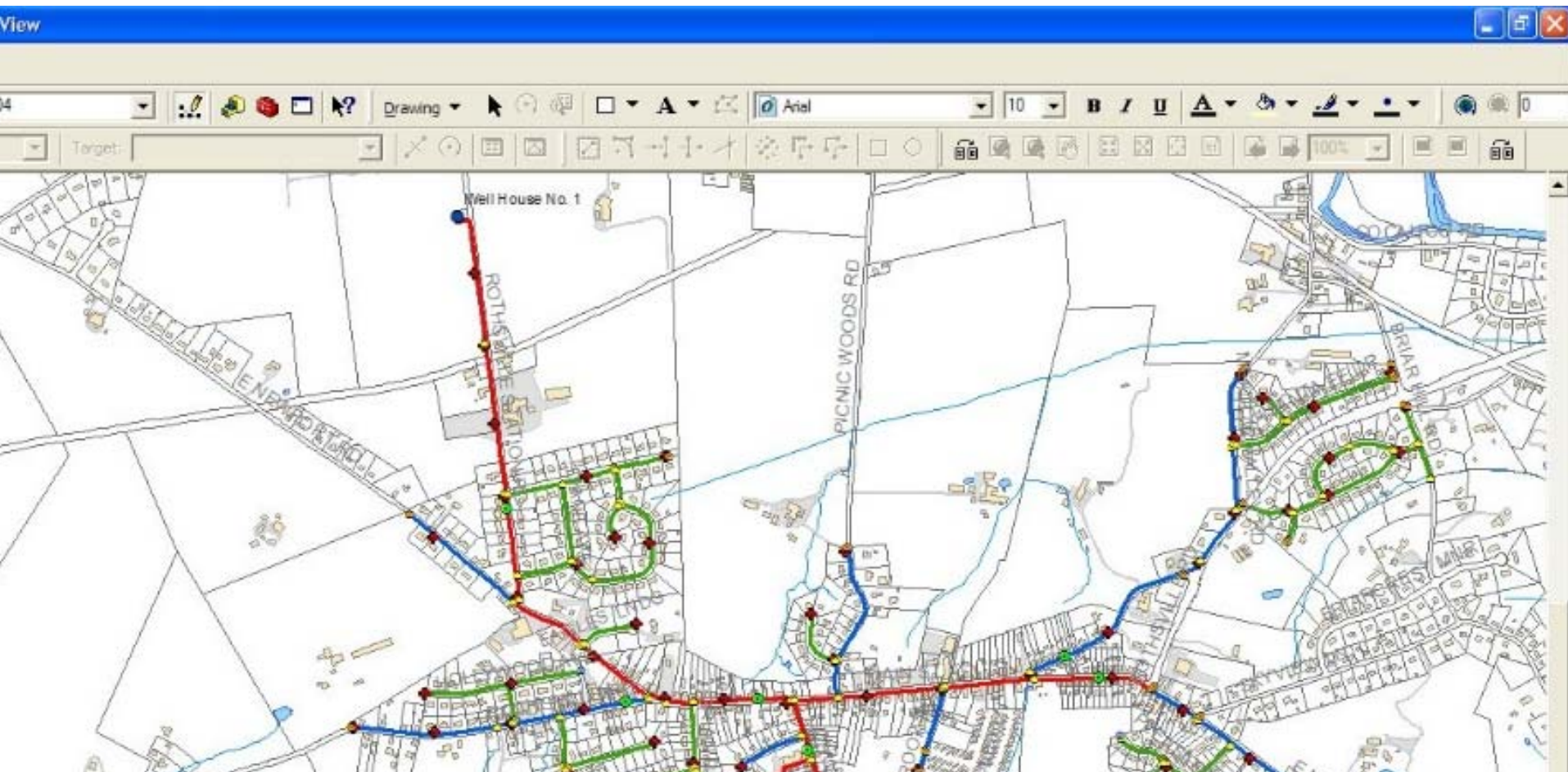
- Good map.
- Valves and hydrants that work.
- Well thought out plan.
- Excellent public communications.

System Maps



Paper? ok if up to date

System Maps



Digital: the way to go

GPS and Good Digital Maps



Need to fix valves and hydrants?



- Identify your needs.
- Prioritize them.
- Budget for them.
- Fix them.

BASIS FOR

ASSET MANAGEMENT

Management

Business Strategy
Regulatory Strategy
Organizational Design
Performance Mgmt
Process Design
Resource Planning
Decision Analysis
Financial Risk

Engineering

Planning
Design
Operations
Maintenance
Reliability
Protection
Equipment Health
Technical Risk

Information

System Architecture
System Integration
Business Intelligence
Knowledge Mgmt
Asset Registry
EAM, GIS, GIS
CMMS, SCM
SCADA, OMS

Questions?

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