Swabbing and Unidirectional Flushing

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A-1 Hydrant Services

Presentation Outline

- Why flush or swab
- Spot flushing
- Unidirectional flushing
- Swabbing
- Risks
- Comparison and summary

Why Flush or Swab ?

- Customer complaints
- Low residuals
- Dead ends
- Lagoons
- Change in treatment chemistry
- Loss of “C” factor
- Planned programs
- Perception

Spot Flushing

- In conjunction with other maintenance
- Generally not organized or systematic
- Does not have lasting effect
- Quick and easy
- No special equipment

Unidirectional Flushing

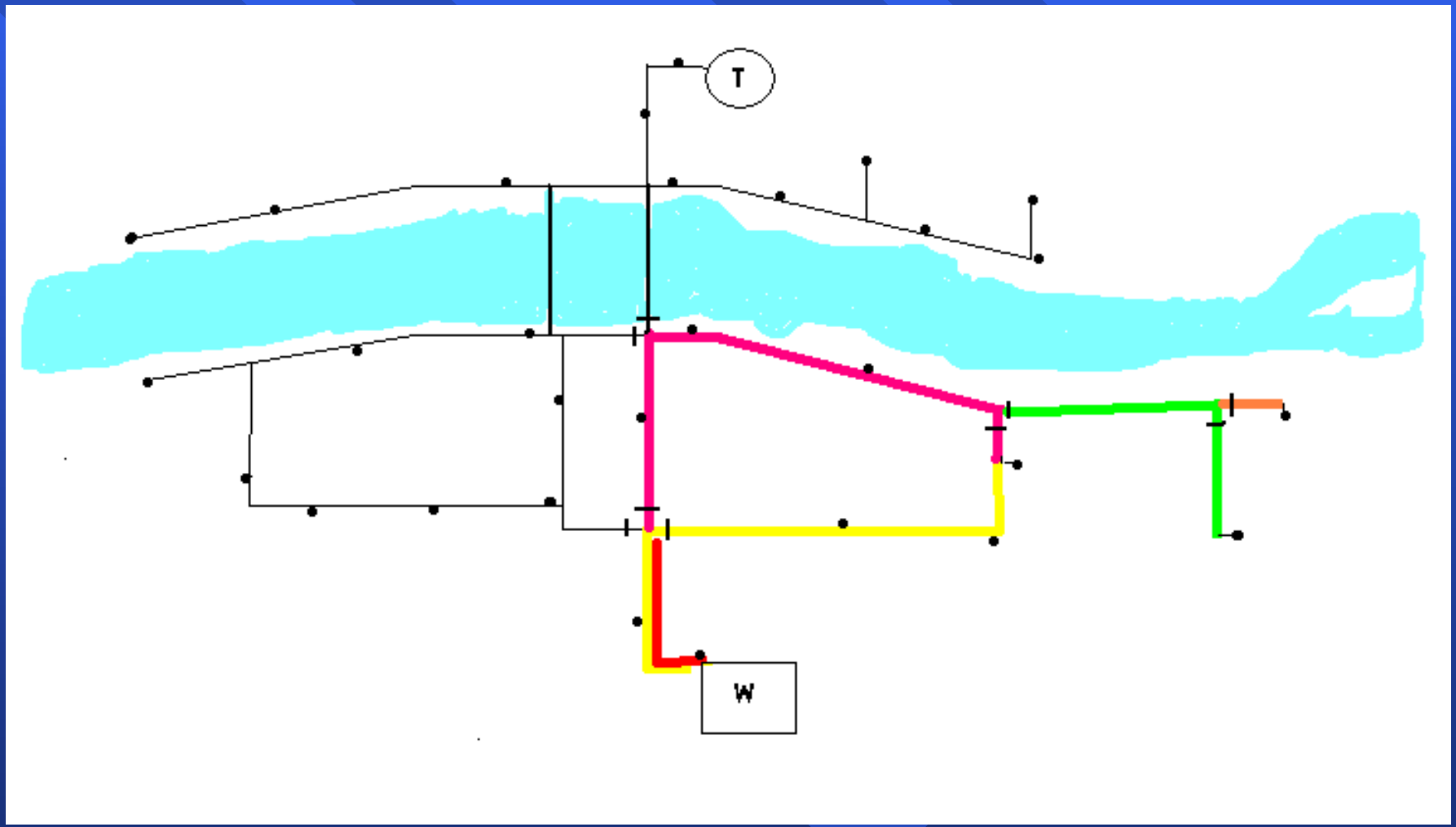
- Water flows in one direction only
- Method is systematic and pre-planned
- More effective scouring
- Uses less water in general
- Improved quality is longer lasting

Swabbing

- More effective than unidirectional flushing (subject to water chemistry)
- Mechanical scrubbing of pipe wall
- More effective against slimes (PVC)
- Most lasting effects
- Comparatively low water usage

Principles of Unidirectional Flushing

- Work out from a source of clean water
- Work from large diameter to small diameter
- Close valves where necessary to ensure flow is from a clean source on a one way path
- Ensure minimum flow rates to produce a flow velocity of 1.5 m/s in the largest diam pipe segment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Principles of Unidirectional Flushing

- Consider leaving completed areas partially isolated to prevent flow back from uncompleted areas (between flushing runs or sequences)
- Consider “normal” flow rates when setting flushing velocities / volumes
- Don’t try to do too much at once

Minimum Flows for Flushing Velocity

DIAMETER	FLOW (0.8 m/s)	FLOW (1.6 m/s)
100 (4)	80 IGPM	160 IGPM
150 (6)	180 IGPM	360 IGPM
200 (8)	330 IGPM	660 IGPM
250 (10)	500 IGPM	1000 IGPM
300 (12)	730 IGPM	1460 IGPM
400 (16)	1300 IGPM	2600 IGPM
600 (24)	2900 IGPM	5800 IGPM

Technical Requirements for Unidirectional Flushing

- Water map showing all valves, hydrants and water supplies
- Hydrant gate valves, discharge hose, flow diffusers, and tarps
- Valve keys and valve box flushers
- Pitot tube for measuring discharge rates
- Monitoring equipment (colourimeter, turbidimeter, pH meter, or white cup!)

Technical Requirements for Unidirectional Flushing

- Filter bed trailer, sand bags, settling area, or sewer for discharge water
- Neutralizing agent for chlorine, chloramines, or pH
- Emergency phone numbers (Fire, Police and Environment)

Record Keeping for Unidirectional Flushing

- Path ID number
- Number and ID of hydrants flowed
- Discharge rate, flushing time, and total volume
- Valves operated (times on and off)
- pH, chlorine residual, turbidity

Record Keeping for Unidirectional Flushing

- Visual appearance of discharge / remarks
- Date, time, personnel
- Physical sample of discharge

Principles for Swabbing

- Work out from a source of clean water
- Work from large diameter to small diameter
- Close valves where necessary to ensure flow is from a clean source on a one way path
- Try to ensure 1 m/s flow speed
- Do test isolation first to ensure perimeter

Principles for Swabbing

- Consider leaving completed areas partially isolated to prevent flow back from uncompleted areas between cleaning projects
- Consider swab condition when setting length of run.
- Avoid downhill runs
- Don’t try to do too much at once

Technical Requirements for Swabbing

- Water map showing all valves, hydrants and water supplies
- Hydrant gate valves, discharge hose, flow diffusers, and tarps
- Valve keys and valve box flushers
- Swabs (1.5 lbs/cubic ft density)
- Monitoring equipment (colourimeter, turbidimeter, pH meter, or white cup!)

Technical Requirements for Swabbing

- Filter bed trailer, sand bags, settling area, or sewer for discharge water
- Neutralizing agent for chlorine, chloramines, or pH
- Emergency phone numbers (Fire, Police and Environment)

Record Keeping for Swabbing

- Path ID number
- Discharge hydrant or blowoff ID
- Discharge rate, flushing time, number and size of swabs
- Valves operated (times on and off)
- pH, chlorine residual, turbidity

Record Keeping for Swabbing

- Visual appearance of discharge / remarks
- Condition of swabs/remarks
- Date, time, personnel
- Physical sample of discharge

Risks of Unidirectional Flushing and Swabbing

- Broken valves
- Broken water main
- Negative pressures
- Exterior zone disruption / flow reversal
- Plugged services (swabbing)
- “Lost” swabs
- Temporary difficulty maintaining residuals

Comparisons

Flushing	Unidirectional Flushing	Swabbing
Least intrusive	Intrusive	Most intrusive
No special equipment	Water map Water model	Launch and retrieval equip.
All pipe material	All pipe material	Avoid cast iron
Least effective	More effective	Most effective

Comparisons

Flushing	Unidirectional Flushing	Swabbing
Inefficient use of water	More efficient use of water	Most efficient use of water
Little risk of contamination	Little risk of contamination	Some risk of contamination
All hydrants and valves	All hydrants and valves	No butterfly valves, slide gate hydrants
Limited to smaller diam	Less limited	Large diam can be swabbed

Questions?