

Document Owner: Manager Customer Planning

## Distribution Flushing and Hydrant Maintenance

**Scope/Purpose:** Planned maintenance procedures to flush potable water distribution network, remove sediment, maximise hydraulic capacity and remove stagnant water at dead ends and ensure that hydrants are fully functional. Flushing is often also undertaken reactively when contamination is suspected.

### Health & Safety and Operational Information

#### Hazard Indicators



#### Personal Protection



#### Health and Safety Information

- Health and Safety documentation.
- Generic Traffic Management Plans or site-specific Traffic Management plan.
- Compliance for discharge to the environment

#### Operations and Maintenance Documentation

- Corridor Access Requests (CAR) and WIP Permits (site specific or generic/global)
- Service plans (B4uDig)
- Design drawings
- Site plans
- Notification Calling Cards

#### Customer Information (Confidential)

Confidential List of Vulnerable customers (DHB supplied list)

#### Priority Customer Categories

- Schools and Childcare
- Commercial premises
- Hospitals
- Aged Care Facilities
- Correction Facilities
- Military Installations
- Oil and Gas Refineries

#### Emergency Procedure / Escalation

##### Emergency

- In event of service strike to utility/energy source (e.g. fuel, Gas, Power, Water etc.) report immediately to team leader
- Make "Site Safe" and isolate risks to people or property with resources at hand
- Key phone numbers

##### Escalate if extra resources required or problems occur!

- Escalate to Team Leader and inform of the issues faced and/or expected resources required if necessary.

#### Additional Documentation

- Fulton Hogan Work Instruction for Disinfection of Water Systems

### Required Skills, Competencies (Qualifications and/or Certifications)

Competent persons only – NZ Certificate in Infrastructure Works Level 3 or higher (or similar) with water strand

## Standard Operating Procedure

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## Distribution Flushing and Hydrant Maintenance

### Required Equipment

Equipment and Information	Details
Fully Equipped Vehicle	Ensure vehicle, plant, equipment and materials appropriate to the day's work schedule is available
Vulnerable & Priority List	Notification of priority customers (impact and duration)
Specialist Equipment	FAC photometer. Approved hydrant standpipe. Flow and pressure gauges.

### Prepare to do the work

Action	Action Details
Pre Start Process	Complete the Daily Pre Start - Planning Maintenance <ul style="list-style-type: none"> <li>- Include Hazard ID</li> <li>- Include Pre-Start Tailgate Meeting</li> </ul> Undertake all tasks required in the Generic Planned Maintenance SOP.
Compliance	<b>Traffic Management Plan</b> - Where required, TMP to be in place prior to work starting. TMP to be accessible on site.
Review Flushing Area	Use GIS to review flushing area, including potential for drainage, water containment and any significant risks.
Review Drainage and Water Containment	Significant volume of water may be being discharged. Review drainage or water containment requirements at each site. This includes any dichlorination requirements.
Notifications	Notify public in advance of possible impacts and duration.
Check Reservoir Capacity	Where applicable ensure reservoirs are full to provide adequate amount of flushing water. Flushing velocity should be 1.5 - 2 m/sec in order to achieve suitable biofilm removal. System pressure in other parts of the distribution system must not drop below 140 kPa during the activity.
List Affected Customers	List affected customers - Identify all addresses affected by network isolation / water shut off

### Perform the work

Action	Trade	Action Details
Planned Flushing Review site drainage and water containment	Serviceperson	Evaluate site conditions and determine appropriate water discharge location
Preparation	Serviceperson	Open hydrant cover and undertake visual inspection of chamber and hydrant. Make note of any problems to report, i.e. water leaks, damaged chamber or lid.
Flushing	Serviceperson	Install fire hydrant riser, fully open the hydrant and direct outlet towards the discharge location. Open hydrant for a period long enough (5-10 minutes) to stir up deposits inside the water main. Flush until the water is clear. Flushing velocity should not cause flooding of neighbouring properties nor scouring or damage to surrounding land or buildings
Recording data	Serviceperson	If pressure testing required - insert cap with pressure gauge, turn hydrant on slowly and record the static/residual pressure If sampling required (FAC, turbidity) collect after 2-3mins of flushing once clear water is flowing and record. Review and evaluate hydrant flows, take action if needed. Record flushing report details - flow/ times of flushing etc as required
Hydrant Maintenance	Serviceperson	Check for leakage (use listening device to detect nonvisible leaks). Remove nozzle caps and inspect threads; replace any missing caps and chains. Clean and lubricate nozzle threads. Check barrel for cracks

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Action	Trade	Action Details
		<p>Open and close hydrant a few times and check for ease of operation. While hydrant is flowing, test isolation valve by closing it. Check for any exterior obstruction that could interfere with operation of hydrant.</p> <p>Check self-draining dry barrel hydrants for proper drainage; if not self-draining remove water (any remaining water may freeze and damage the hydrant).</p>
<b>Unplanned/Reactive Flushing – Preparation (see information and diagrams below)</b>	Serviceperson	<p>Prepare flushing plan based on nature of complaints or location of transgression or requirement to flush clean water through potentially contaminated reticulation. Using reticulation plans and knowledge of direction of water flow/location of reservoir etc identify which valves and hydrants will need to be used and the sequence of the operation. Unidirectional flushing can be used when trying to clear a known or suspected area where contamination has occurred (see diagram below)</p>
<b>Unplanned Flushing activates</b>	Serviceperson	<p>The procedure to be followed is the same procedure as that for scheduled work.</p> <p>If in response to a taste or odour problem a consumer has experienced then usually this will involve flushing from at least 2 hydrants, being at least 100m either side of the complainant where it is a ring main.</p> <p>In the case of a dead end main flush at the very end hydrant only. Channelling water for a specific reason will involve unidirectional flushing, follow the plan prepared</p>
<b>Further notification</b>	Serviceperson	<p>If a hydrant is inoperable, tag it with a clearly visible marking and immediately report its condition so that it can be reported to the fire brigade and scheduled for repairs.</p> <p>If a hydrant is frequently under water due to its location in a flood prone area, the hydrant should be relocated</p>
<b>Close out</b>	Serviceperson	Carry out work order closure procedures

Further information

<b>Common Problems</b>	Competent Person	<p>Reduction in water pressure and aesthetic issues such as <b>discoloured water</b> and sediment can be experienced in the location of the hydrant, reassure residents that discoloured water should not be a health hazard (public pre-notification will help eliminate this). Unusually high or low FAC readings on completion of flushing – recheck at hydrant and confirm FAC at adjacent sites before reporting</p>
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#### Comparison of flushing methods

##### Conventional Flushing

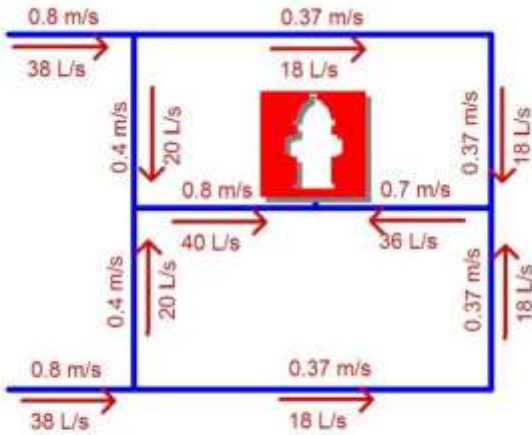
- Water from all directions
- Low flow velocities
- Less scouring
- Don't control flushing direction

##### Unidirectional Flushing

- Water Channelled
- Higher flow velocities
- More scouring and better cleaning
- Systematic valve operation

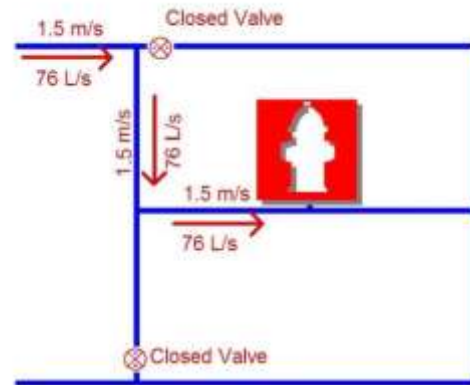
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**Distribution Flushing and Hydrant Maintenance**



*Conventional flushing in a looped system results in water flowing toward the hydrant from all directions generating lower flow velocity and less scouring of the pipes.*

Can result in dirty water flushed to clean areas



*Unidirectional flushing results in water flowing toward the hydrant in only one direction resulting in higher flow velocity, more scouring and better cleaning of the pipes with less water use.*

Uses up to 40-80% less water and is preferred method