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District of Lake Country

Alternative Water Main Flushing Procedures

District of Lake Country
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District of Lake Country Water Pipe Flushing Procedures

Background

The District of Lake Country utilises the American Water Works Association (AWWA) standards for all potable drinking water infrastructure works. The AWWA's ANSI/AWWA C651-14 is the standard for disinfecting water mains, the minimum recommended flushing velocities specified within this document are 3.0 ft/sec (0.91 m/sec). Achieving these velocities and the required quantity of water exchanges can be challenging and often operationally unachievable or just cost prohibitive. The AWWA does however provide alternative solutions to cleaning the pipe if the desired flushing velocities are unattainable that the utility owner may choose to utilise at their discretion.

The District's desire to meet the AWWA's minimum standards versus what is realistically achievable within the operational constraints is an ongoing challenge that requires a coherent solution.

Aim

To establish procedural options acceptable to the District for satisfactorily cleaning water main pipes when the AWWA's flushing velocities of 3.0 ft/sec (0.91 m/sec) cannot be realistically and/or practically achieved because of constraints such as adequate water supply and suitable water disposal areas. Especially when considering larger pipe diameters.

Procedural Approval Process

The following options are considered as acceptable solutions to flushing and disinfecting the water main pipes only when the AWWA's standards cannot be met due or reasons of practicality or cost. This decision will be at the discretion of the District engineer or their designate. Any alternative procedure must be submitted formally in writing at least **3 weeks prior** to the flushing event taking place to the District engineer. If approved, confirmation in writing will be returned.

Flushing Procedure Options

The following procedures, when approved by the Director of Infrastructure Services, may be employed in lieu of the AWWA's standard 0.9m/s:

1. Open Pipe Flushing

This technique is best suited to situations where the pipe has a suitable gradient that will ensure the minimum desired velocity is achieved. A free online tool for calculating the velocity can be found here: http://www.hawsedc.com/engcalcs/Manning-Pipe-Flow.php

This method involves leaving both end of the pipe open and flowing sufficient water to achieve the flushing velocities and water exchanges as stated by the AWWA. The benefit of this technique is that it doesn't require the pipe to be full of water and utilises the gradient to achieve the required velocity and therefore requires less volume of water which can also be delivered at a reduced flow rate. The wetted or scoured area is greatly reduced to a fraction of that achieved with closed pipe flushing, but with a combination of diligent pipe installation procedures and an experienced workforce, the reduced surface area may be acceptable.

Collection and disposal is to be managed in such a manner as not to detrimentally effect the to ensure environmental and infrastructure

When no drainage corridor option available the following technique is an one example of an option:

By creating a sump preferably lined with an impermeable membrane in which a sump pump can be placed and the water discharge pumped to a convenient dispersal point. As the ends of the pipe remain open during the flushing operations, extra care is to be taken to ensure the cleanliness of the pipe is maintained and that foreign material cannot be inadvertently introduced intro the pipe during flushing operations. See **Figure 1** for an example of open pipe flushing technique water disposal setup. There are numerous variations on this setup that will achieve the same results, the setup and procedures adopted will be scenario dependant as there are too many factors to consider to be able to prescribe one method that fits all. The Owner or designate will approve the technique prior to flushing procedures taking place.

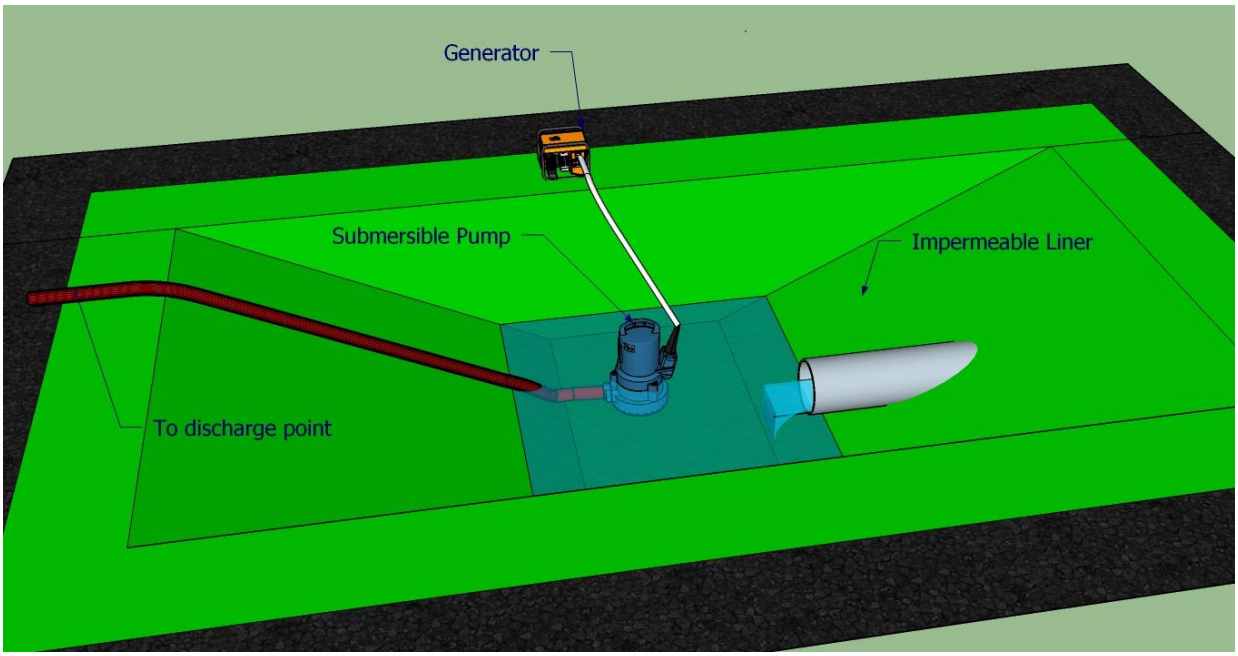

Figure 1. Example of Open Pipe Flushing Technique Water Disposal Setup

2. Pigging or Swabbing

This technique involves a tight fitting cylinder of material being forced through the pipe by water pressure to clean the pipe of any debris. This operation is typically performed by utilising a foam rubber 'pig' or 'swab' that is discharged through a temporary lead or an open fire hydrant barrel (i.e. main valve stem removed). A launch pit may be required to be excavated to allow the installation of a launch pipe on a wye junction and therefore proper working procedures are to be employed when such excavations are required. Consideration is to be given to the protection of the area surrounding the discharge point. If a hydrant is used, a barrier is to be placed to protect the ground surrounding the hydrant from erosion or saturation. This is often achieved using tarps or wooden boards.

Post Flushing Procedures

Once flushing has been performed by either Open Pipe Flushing or Pigging/Swabbing and to the satisfaction of the **Owner** or their representative or designate, the following remaining sterilising and testing procedures shall be followed in accordance with AWWA standards.