CITY of NAPA

BACKFLOW SCREENING GUIDELINES

(To be used in conjunction with the City of Napa Design Guidelines)

February 2007

Screening Backflow Devices

Background

In the 1980's, the State of California initiated the Title 17 of the California Code of Regulations which requires public water systems to protect their water supplies from contamination by implementing a cross-connection control program. The code specifies that the scope of the cross-connection control program must include provisions for the protection of the drinking water supply through the installation of appropriate backflow prevention assemblies at all water user's connections where a hazard or potential hazard to the water supply is identified by the public water system. The reason for the new regulation was to protect the public water supply from contamination due to back-pressure or back-siphonage from a private water service.

Since that time, the City of Napa has implemented new standards and ordinances incorporating backflow devices to all new services and any existing service where there has been a change in use. Within the Public Works Standards, the City identifies two types of backflow devices. The most common backflow device is the double check valve, which is used for residential properties, fire services, and some irrigation services. These backflow device assemblies protect the system by stopping the water from moving backwards with the first valve. The second valve is in place in case the first valve doesn't stop the backward flow ("double check"). The second most common backflow device used is the reduced pressure backflow device, which is used for commercial properties and most irrigation services. Unlike double check valves, these devices are required to be open to the atmosphere since they dump large quantities of water when activated.

Although backflow devices are required to be installed per local and state regulations, the installation of the devices often are viewed as negative impacts to projects because of their size and unattractive design. Backflow devices, when not used for a single-family residence water service, are required to be placed outside of the public right-of-way near the property boundary. When the devices are not considered as part of the project design, they are often placed at the public right-of-way in plain view of the public eye, resulting in a negative impact to the appearance of the project frontage.

Since project designers, planners, architects, developers, and engineers strive to create projects that are appealing to the public, it is in the best interest of all to incorporate backflow devices into the initial design of projects. These guidelines were created to assist the public in different methods of mitigating visual impacts of backflow devices while meeting local and state requirements for installation and maintenance of the devices.

Screening Methods

One of the most important things to consider when trying to screen backflow devices is how can the screening method can be incorporated into the project architecture. Many last minute designs incorporate miscellaneous architectural pieces that can detract from a project. For instance, the use of trellises made of natural materials (such as wood) when project focuses around a contemporary modern industrial building that uses more hard material (concrete and metal) is architecturally inconsistent, bringing more attention towards the backflow devices. Wooden trellises are more likely to be used with projects involving natural materials such as cottages or Victorian buildings, while rock and concrete walls are more likely to be used with industrial or more contemporary buildings. Addressing visual impacts should be viewed as an opportunity to bring more visual interest to the front of a project, instead of another issue to address.

Methods of screening that have been used to date include utility closets, landscaping plants, project signage/walls, trellises/fencing, vaults (for double check valves only), painting the device, and faux

rocks/device cages. Although this list does not limit the possibilities of what materials can be used, there are some requirements that the screening method must apply.

Screening guidelines include (but are not limited to):

- 12-inches shall be left clear around all sides of the backflow device (more for utility closet installations) for maintenance purposes
- Trees shall not be planted within 10-feet (large shrubs within 5-feet) of any backflow device.
- Device should be fully accessible for annual maintenance and emergency purposes.
- All backflow devices shall be placed within 20-feet of the public right-of-way (in line with the service connection from the water main in the street).
- Installation shall meet the City of Napa Public Works Standards W-6A & B and W-7A & B.
- Screening method must provide 80% screening of the device within the first year, and 100% by the second year.
- Landscaping should not be used as the only method for screening. Landscaping should be used conjunction with a wall, trellis, or other accepted methods.

Utility Closets

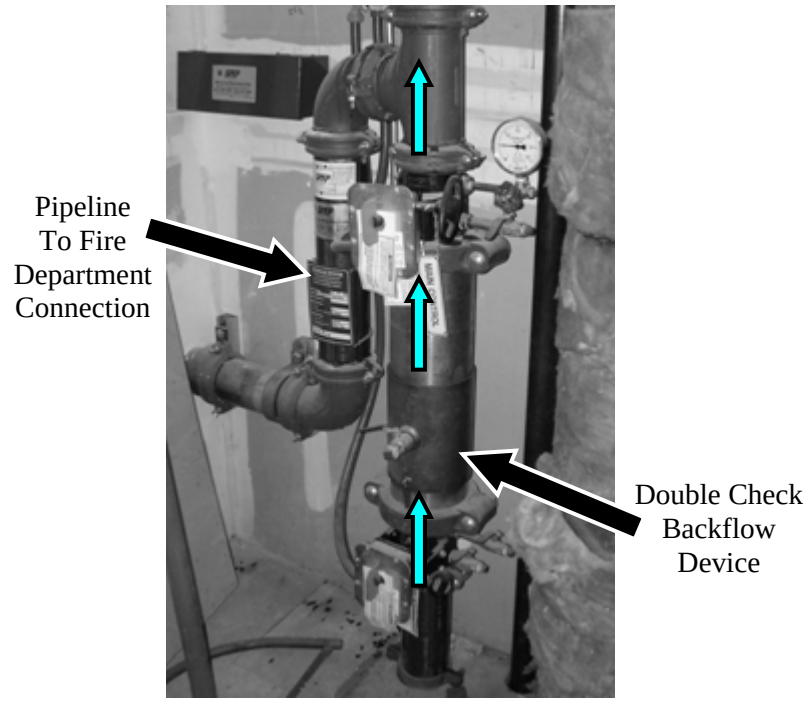
Placing backflow devices inside utility closets is one of the newer options welcomed by Developers, especially for buildings located at the public right-of-way property line in downtown Napa. A few of the buildings that are new or have been retrofit with interior backflow devices include the new homeless shelter off Hartle Court, the Goodman Library, and the Napa Opera House. Projects currently being constructed that designed to place the backflow devices within utility closets include the new Inn at Napa Town Center, the West Main Street office building, the Ben Franklin building remodel, the new Mi Favorita Market, and the Napa Square office building.

Utility closets are usually a dedicated room within the main structure of a project, although a secondary structure could be used as a utility closet. The typical minimum size of a utility closet (supporting a single backflow device installed in the vertical position) is 6-feet by 4-feet. This space allows for a maintenance person to enter the room and fully access the backflow device if the door needs to be shut. To conserve space, vertical installations are recommended whenever possible. However, since many models of backflow devices are still not approved by AWWA for vertical installation, different backflow device models should be researched to verify whether or not they are approved for vertical installation. To estimate the size of a utility closet, the following two rules should be included: 1) backflow devices need to be *one* foot away from walls and other structures (including, but not limited to, other backflow devices), and 2) there should be *three* feet minimum clearance in front of the backflow device (with the utility closet door closed). If the utility closet is shared with other utilities, required separations for each utility should be included.

With new buildings, utility closets should be incorporated with the design of the building. Including a utility closet in the beginning can alleviate future issues that usually arise when the backflow device locations are not considered, such as changing structural designs to make room for them. A utility closet provides a dedicated space where the backflow devices can be installed, maintained easily, and protect them from the elements (which can prolong the life of a backflow device).

When an existing structure is being renovated, it is sometimes difficult to dedicate space for a backflow device. However, even in some of the oldest buildings in town, project managers have been able to create a dedicated utility closet for backflow devices with some help from backflow prevention specialists. The images below show a fire service retrofit installation inside of an existing building in downtown Napa.

The room previously was used for other utilities, so it wasn't difficult to incorporate the fire service backflow device into the room. Fire services usually are required to have an FDC (Fire Department Connection) attached to the service for the fire department's use, which are often required to be placed on the exterior wall of the structure (location to be specified by Fire Department). To protect the public water system, FDC's are required to be placed on the backflow device protected side of the service.



Although utility closets are the preferred method for addressing visual impacts, projects need to meet the following prerequisites before utility closets can be used:

1. The utility closet must lie within 20-feet of the public right-of-way (back of sidewalk) containing a public water main. Projects designed with parking lots in front are likely unable to meet this requirement.
2. Services must come straight from the water main to the utility closet. Services may not run for extended distances in the frontage to get to the utility closet.
3. The utility closet must have one wall fronting the public right-of-way to permit the riser to the backflow device to come immediately into the utility room. The water service will not be permitted rope around the structure nor underneath the foundation of the structure to get to the utility closet.

For details regarding utility closets and other interior installations, please refer to the City of Napa Public Works Standard Drawings W-6B and W-7B. These drawings along with other water standards can be found on-line at www.cityofnapa.org/water (under Standard Specifications).

Vaults

Vaults are the second most commonly recommended means of addressing visual impacts. Although they are not visually appealing when used alone, they can remove issues that arise when trying to use above ground structural elements to address the visual impacts. For instance, tall signs and trellises on an intersection corner may not be allowed due to visibility impacts to drivers and pedestrians. However, if the backflow device is placed within a vault and surrounded by low-lying shrubs and flowers, the visibility concerns for drivers and pedestrians would no longer apply and the visual impacts of the backflow device would be mitigated.

Unfortunately, there are some limitations for the use of vaults. In particular, vaults may only be used to screen double check backflow devices. Any backflow device that dumps water when activated may not be placed in an underground vault, which usually include backflow devices on commercial, industrial, and irrigation services. Fortunately, the backflow device for fire services (usually the largest service) are double check valves so they may be placed within vaults.

Since vaults are flush with the ground, they have the tendency to fill with water, so drainage becomes an important factor in maintaining the device. Engineers should incorporate any drainage necessary to ensure the vault doesn't fill with water for extensive periods of time. If vaults don't drain, this can cause issues with maintenance of the backflow device, and can shorten the life of the backflow device.

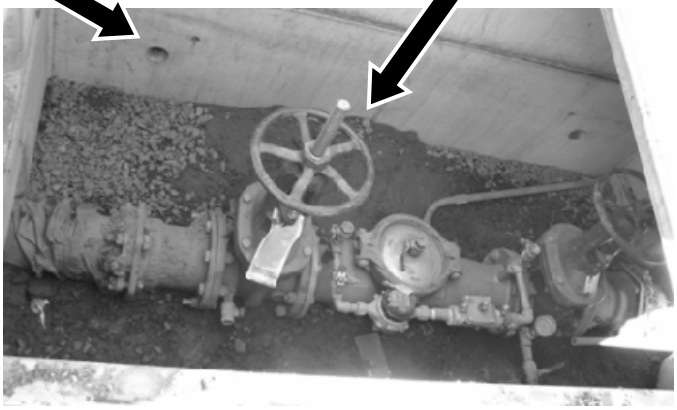
Project designers should consider installing vaults in conjunction with landscaping so that the metal frame of the lid doesn't detract from the rest of the landscaped frontage. If the vault will stretch across the expanse of a landscaping strip (such as a strip separating the parking from the public sidewalk), other locations and means of screening the backflow device should be considered so that it doesn't detract from the rest of the landscaping.

Sometimes vaults are installed within parking spaces so that vehicles don't regularly run over the vault (which can prolong the life of the vault lid) and the space can be temporarily "closed" so that the backflow device can be easily maintained (see images below). Vaults subject to be run over by vehicles must have heavy load traffic rated lids (T-20). Limitations of distance from the service connection in the public right-of-way will still apply. Since vaults for backflow devices and backflow devices are privately maintained, vaults are not permitted to be installed within the public right-of-way or in a public sidewalk.

Utility Vault (Traffic Rated Lid)

Drainage Hole

Backflow Device Within Vault



What Not to Do:

Public can easily notice the vault from the public sidewalk

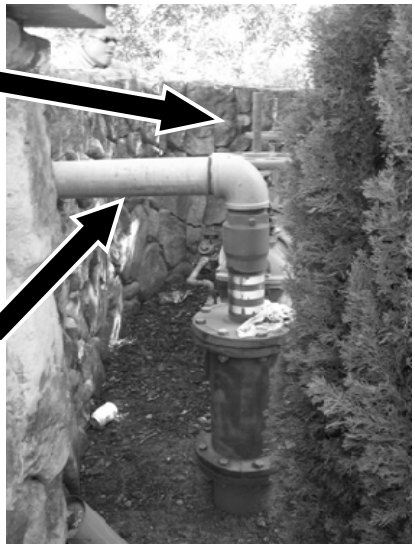
Vault is placed within the middle of grass, not surrounded by other landscaping shrubs or flowers

Project Signage and Walls

Sometimes projects have the ability to incorporate walls and signage into the property frontage near the public right-of-way. When this option is available, it can be one of the cheaper means of addressing the visibility impact of all backflow devices, including reduced pressure devices. However, separation requirements for maintenance purposes still need to be met, so available frontage space will need to be considered.

The images below show a private street where a fire service needed to be installed at the entrance to the private drive. From the entrance of the private street, the only indication of the fire service being present is the fire department connection located on the wall itself. From behind the wall, the owner placed a row of hedges in front of the backflow device to address the visual impacts from within the private drive. In this example, the backflow device could have also been painted to blend in with the rock wall which would have screened the device even more.

Fire Department Connection

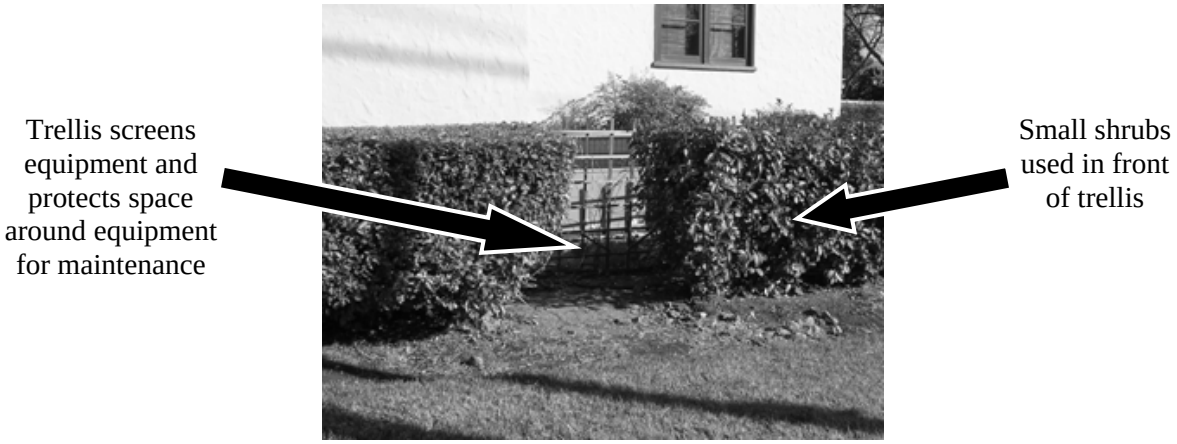


Double Check Backflow Device

Pipeline To Fire Department Connection

Trellises & Fencing

Similar to walls and signs, trellises and fencing can be used in a similar manner, as permitted by the Community Development Department. Using trellises, as with other methods, requires consideration of the architecture and landscaping style of the project. Trellises and fencing should be compatible with the architecture making the screening of the backflow device a feature with the rest of the project frontage, and not an independent element that stands out. Since addressing visual impacts requires 100% screening of the backflow device within 1 year, trellises and fences usually can not be used for screening purposes alone. The use of vines or other small shrubs along the trellis or fence may assist with the screening, as would painting the device to match the project structure or foliage (natural colors such as creams, browns, and greens). However, the foliage should match or be comparable to other foliage used for the property. For instance, if the frontage uses mostly draught resistant plants such as purple fountain grass, using ivy along the trellis would be inconsistent with the landscaping scheme. In the image below, an air conditioning unit is surrounded by a low trellis with small shrubs fronting the trellis. In this example, an additional shrub should be added between the existing shrubs to provide 100% screening.

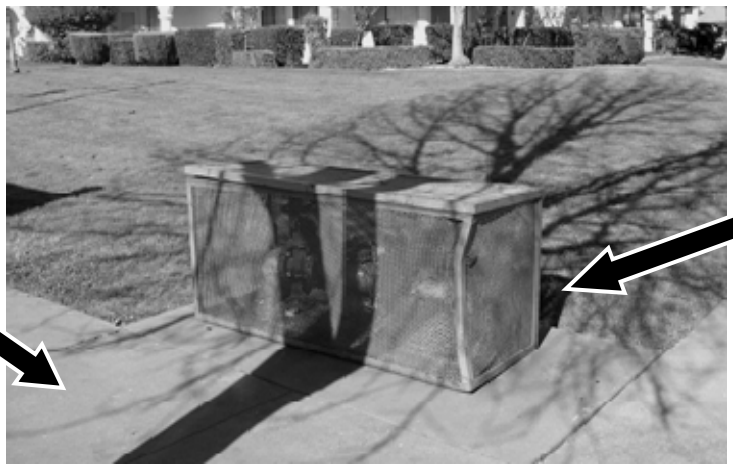


Cages & Faux Rocks

As backflow devices become more prevalent in California, manufacturers are making more equipment for masking and protecting above ground backflow devices. Cages are often used to protect the device from others tampering with the device or damaging the device. The cage also serves as protection from surrounding plants and helps keep a space around the device for annual maintenance and emergency purposes. However, the cage by itself can be as visually unappealing as the backflow device itself, so it should not be used alone. This method should only be used if larger structures can not fit in the limited area of the backflow device (such as trellises) to be effective and the device is a small reduced pressure backflow device (such as a 1" or 1.5"). Since all double check valves can be placed in a vault or a box, and can be flush with the ground, double checks shouldn't be installed within cages. If a cage is one of the only options available, low lying shrubs and plants should be used to surround the device. The density of foliage should be consistent with the rest of the property landscaping. If the landscaping for most of the property only contains grass and a couple of trees, the landscaping for the property may need to be adjusted with more low-lying shrubs and plants to integrate the backflow device screening with the rest of the landscaping.

The image below shows an example of what the cage looks like. However, this examples shows how much of a visual impact the cage can be if not surrounded and blended in with landscaping.

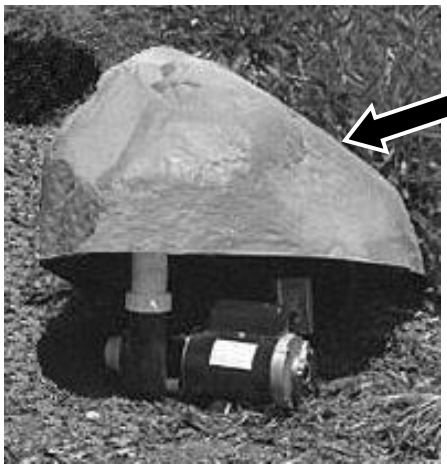
What Not to Do:



Public can easily notice the vault from the public sidewalk

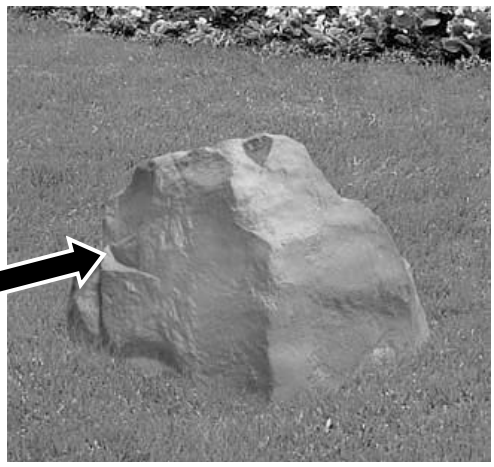
Device & cage is placed adjacent to public sidewalk and grass

Faux rocks becoming more popular private homes for minor visual impacts, and are less likely used for backflow device visual impacts. They are hollow inside providing space and protection for smaller devices, as shown by the images below. This method works well if the architecture and landscaping involves rocks and other natural features in addition to a faux rock cover. However, the faux rock can be an overwhelming in size to hide backflow devices, and should only be considered from small service applications.



Faux rock covers device (nearby installation of small shrubs)

Faux rock in middle of grass can seem out of place unless rock feature is part of surrounding landscaping & architecture



In some areas, bags and other material wraps are used to cover the device in order to protect it from the environment and to protect water from freezing. Although wraps can assist with prolonging the life of a backflow device, the material tends to deteriorate over time, is usually neglected and uncared for, and tends to increase visual impacts of the backflow device more than the device itself. If covers should be used, they should be incorporated with other approved methods of screening which should be consistent the surrounding landscape and architecture.

Landscaping

Landscaping on its own often is not enough to mitigate the visual impacts of backflow devices without the addition of walls, trellises, or other method of screening. In limited spaces, if the device is also painted to match the surrounding colors, it can blend in much better than it would without the assistance of landscaping. In the image below, although the backflow device is visible, the plants are still young. Within one year, the plants will have grown to the level of the backflow device and be a much more effective screening tool. However, in this example, it is important for the shrubs to be maintained such that there is a separation between them and the backflow device. With no separation between the device and the shrubs, maintenance of the backflow device becomes extremely difficult and may require removal of some of the shrubs, thus removing the screening of the backflow device. Please note that under current installation requirements, it is unlikely for the Fire Department Connection (FDC) to be attached to backflow devices. This allows for the backflow device to be 100% screened instead of partially screened to allow the FCD to be visible.

Small shrubs assist in screening backflow device

Backflow devices are required to be above ground if fire department connection is attached to back of device

Conclusion

If there is uncertainty whether a particular screening method addresses the visual impacts for your project, ask the following questions:

- What is the first thing I want people to see when they look at my project?
- Are the utilities shifting attention away from what I want them to see?
- Does the screening detract from the project architecture and landscaping?
- Is there anything else I can do to help screen the utilities?

This document should only be used as a guideline for backflow device screening methods. Other methods for screening backflow devices may be accepted. Projects should also consider the visual impacts of other utilities and refer to the local utility offices and the Community Development Department when screening other utilities. Whichever method of screening is proposed, all proposed screening for backflow devices must be reviewed and approved by Water Division staff and Planning Division staff for each project prior to installation of the backflow device and screening method.