



**A Guide to Assist Nova Scotia  
Municipal Water Works Develop a**  

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**Cross Connection Control Program**

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A Guide to Assist Nova Scotia Municipal Water Works  
Develop a Cross Connection Control Program

Department of Environment

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## What is Cross Connection Control (CCC) Program?

A cross-connection control program is one of several measures in the Multi-Barrier Approach to prevent contamination of treated water in the distribution system. The aim of a cross connection control program is to ensure that proper backflow prevention devices are installed and maintained to prevent backflow or back-siphonage of potentially hazardous substances into the water supply.

### Why is a Cross Connection Control Program Required?

In addition to being a requirement of a facility's Approval to Operate, a cross connection control program is in-line with industry best practices. When a CCC program is properly developed, implemented and managed, liability concerns are mitigated, and the utility can more effectively demonstrate their due diligence in operations.

**Cross Connection** is any actual or potential connection between the public water supply and any pipe, vessel, tank, plumbing fixture, equipment or device connected to a non-potable system.

**Backflow** is the reversal of flow in the public water supply caused by either back-siphonage or back pressure.

**Back Siphonage** is caused when a reduction in pressure results in a partial vacuum in the piping system.

**Back Pressure** is caused by a source of pressure that exceeds the public water supply pressure. This causes fluid or gas to be pushed into the water supply.

## Where is Backflow Prevention Required?

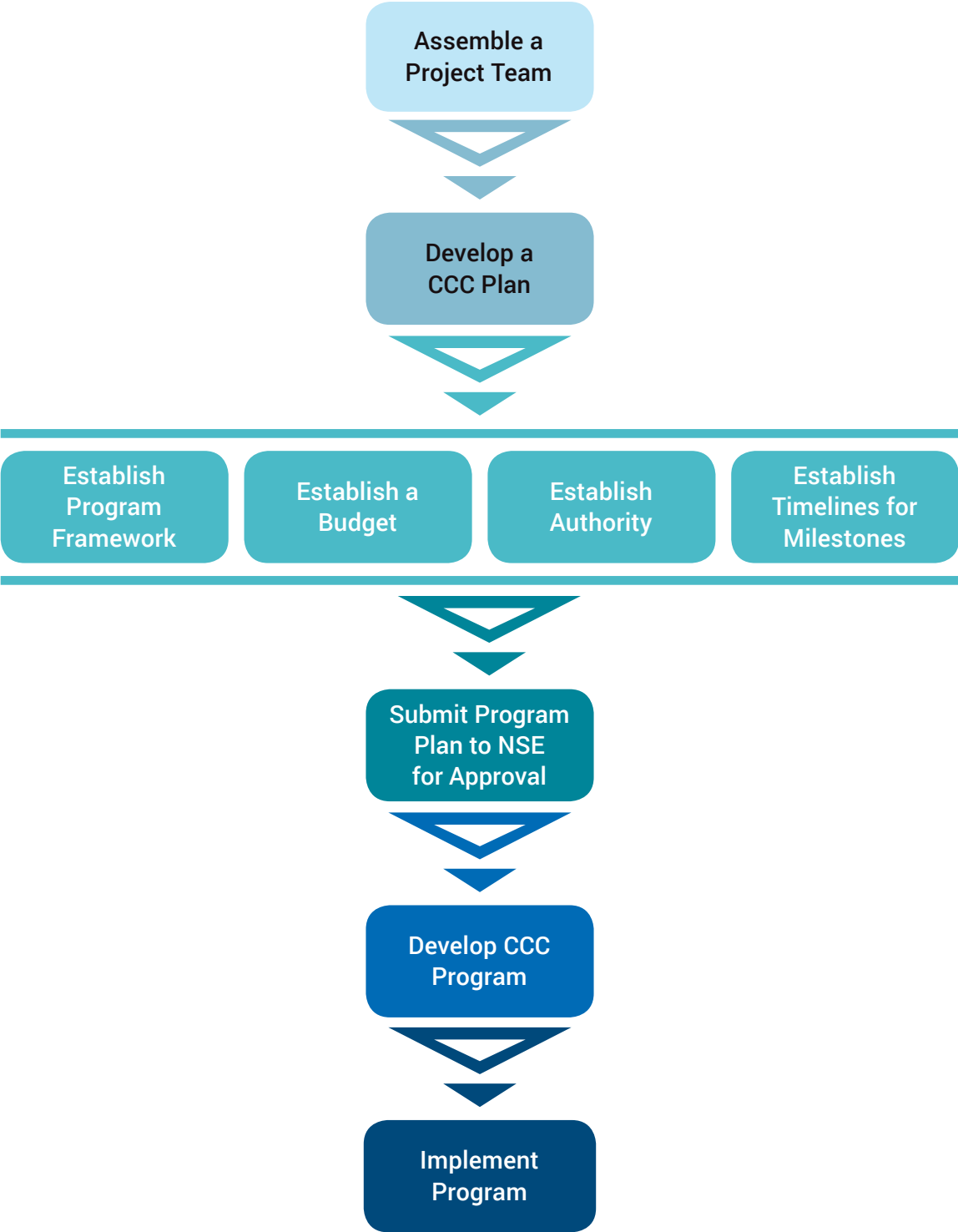
In order to meet the requirements of the Department, the cross connection control program must ensure that backflow prevention devices are required to isolate all facilities classified as either severe/high or moderate risk. Backflow prevention devices must, at a minimum, be installed at or near a point where the water supply enters a building or facility and before any other branch connections. This is known as premise isolation.

**Zone, Area or Individual Isolation Programs ensure that occupants within a premise are protected from sources of cross connections that could potentially contaminate water within the building. Zone, Area or individual isolation is not required as part of the Department's mandated cross connection control program.**

## Backflow Prevention Methods and Devices

Backflow prevention can be achieved by an approved air gap or mechanical device. Air gaps provide the highest degree of protection from backflow however in some installations a mechanical device is required. There are many different types of mechanical backflow prevention devices and selection of an appropriate device depends on the types of conditions (back-pressure and/or back-siphonage) and the severity of the health hazards present in the facility. Testable backflow prevention devices are recommended for all applications.

# How do I get Started?



## Assemble a Project Team

The first step in assembling a project team is to identify a strong project manager who has the time and ability to lead this initiative. The project manager, whether internal or external, will require support from a project team made up of managers, engineers, operators and administrative staff who will ultimately play key roles in the development and implementation of the program.

## Develop a Plan

Once you've established a project team, your next step is to develop a plan outlining the course of action you will take to develop and implement the program. The plan will be unique for every facility in Nova Scotia but should include, at a minimum:

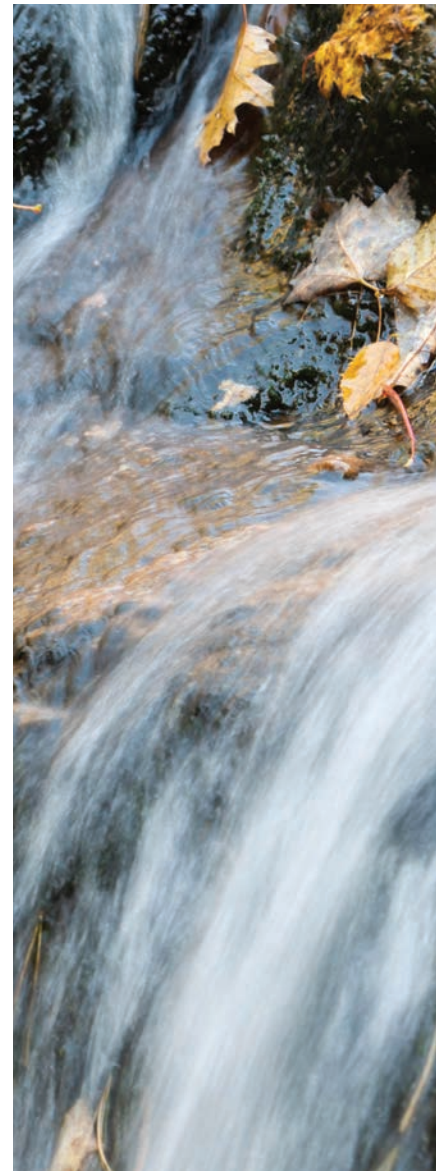
- Program Framework
- Budget
- Authority
- Timelines

### Program Framework

The program framework is essentially an outline of the key elements that make up your CCC Program. While each plan may differ between utilities, all programs should include, at a minimum, the following components:

- Program Scope
- Overview of Authority and Power to Enforce
- Roles and Responsibilities
- Hazard Classification Framework
- Survey of Facilities
- Program Administration
- Backflow Incident Response
- Public Education Plan

Each of these topics is discussed in more detail below. From a planning perspective, enough thought should be given to each of the program components so that sufficient resources are allocated to program development. Supporting documentation such as policies and procedures can be developed during the program development phase.



## Budget

To ensure a successful and sustainable CCC program, it will be important to identify all costs associated with the development, implementation and on-going maintenance of the program. Some cost considerations might include:

- Staff training
- Additional human resource requirements
- Data management software
- Public education initiatives
- Facility survey and hazard assessment
- Ongoing inspections and data management

It may be helpful to breakdown the budget to reflect initial costs versus annual operating costs for the program.

## Authority

Establishing legal authority is critical to ensure the intent of the program is met. Without authority and mechanisms to enforce it, the program's implementation may not be successful. Some utilities may have the necessary authority while others may have to create or amend legislation to grant them the authority required to implement the program.

This might take the form of a by-law. In your submission, clearly indicate what your current authority is, whether gaps exist that will prevent you from implementing your program and how you will work towards addressing those gaps.

## Implementation Schedule

Your CCC Plan submission should include timelines for key milestones. The timeline should include, at a minimum, the actionable item, development timeline and implementation timeline for each of the program components outlined above in the Program Framework section. If you've discovered that you do not currently have the authority in place to implement and enforce your CCC Program, this should be one of the first and most important actionable items identified in your timeline.

## Creating a Bylaw

The bylaw should clearly outline the following:

- Cross connections are prohibited
- Backflow prevention devices must be acceptable to the owner of the water supply
- Reference to CSA/NPC standards
- Inspection, testing and reporting requirements
- Notification requirements (backflow incidents, failure in testing)
- Compliance activities and timelines
- Consequences for not adhering to the conditions outlined
- Outline water supply owner's right to access a building to conduct a survey and hazard assessment or inspect backflow prevention devices
- Certification/licensing requirements
- Responsibility of consumer regarding installation/maintenance/installation costs



You are encouraged to develop a more detailed project plan for your own use, to facilitate project management. A detailed project plan helps:

- The project team to identify the necessary steps required to carry out each component of the program.
- The project manager to identify all costs, large or small, associated with the development and maintenance of the program.
- Clearly communicate deliverables and timelines to the project team.

## Submit Your Plan to NSE

Once developed, your plan should be submitted to NSE for review and acceptance to ensure it satisfies the requirements of the Department. If you have any questions during the planning phase, you are encouraged to contact the Department.

Once you've received confirmation that the plan is acceptable to the Department, you and your project team can begin work on program development and implementation.

## Develop Your CCC Program

There are numerous guidance documents available as well as examples of CCC programs across the province that can help you to formulate yours. This section will provide you with some guiding questions to help you think about key elements that should be captured in the creation of your Program.

### Program scope

In order to frame up the scope of your program you should consider the following:

- What is the goal of the program?
- What are the responsibilities of the utility?
- What are the responsibilities of the building owner?

Within your organization, you may want to further define roles and responsibilities of staff members in the implementation of the program. You may also want to establish a policy and/or procedure(s) which outline the program and/or specific activities within the program. The intent of these documents is to provide in-depth information for staff who oversee the program.



## Authority

Once you have established the legislative authority required to enforce your program, you may want to develop supporting documentation for internal staff and for public education and communication purposes. These can take the form of procedures, guidance documents, by-laws etc., and should consider the following:

- Who is responsible for the administration of the program?
- What mechanisms are in place to enable municipalities to require cross-connection control devices (e.g. by-laws)?
- How will this program be enforced?
- What are some of the enforcement actions that will be undertaken?

## Survey of Facilities

You will need to undertake a survey of the facilities in your distribution system to identify those considered severe/high risk and moderate risk using the **Hazard Classification Framework** provided in Appendix A. Once identified, you should develop a plan to assess or have these facilities assessed for:

- Actual or potential cross-connection hazards.
- Type of hazards present at each building in order to determine the type of backflow preventer required.

Depending on the size of the distribution system and prevalence of severe/high and moderate risk facilities, the utility may want to prioritize the assessment of facilities based on risk category, size, age, financial and human resource availability. A timeline of the proposed approach should be provided to the Department for review. The assessment can be completed internally or externally as long as the person(s) undertaking the survey are qualified to do so.

### Who can inspect, test and repair backflow prevention devices?

A backflow prevention device is only reliable when designed, installed, tested and maintained according to industry standards. A plumber of sprinkler fitter is required for installation. Only persons with valid CCC testers certification should inspect and test backflow prevention devices. The Atlantic Canada Water and Wastewater Association (ACWWA) regularly offers preparatory courses for the American Water Works Association (AWWA) Cross Connection Control testers examination. Certification is valid for five years at which time a re-certification course can be taken.

## New Construction or Renovations

All applications for new construction and renovations affecting water services should be reviewed to ensure that cross connection hazards are properly identified and mitigated with the appropriate device. This information should be kept on record to track on-going maintenance of the devices.

## Program Administration

### Record Keeping

To ensure the goals of the program are being met, the following information should be kept in a data management system:

- Cross connection survey and hazard assessment results for each building.
- Inventory of backflow prevention measures and/or devices (type, size, make, model, serial number, location).
- Inspection and testing reports.
- Backflow incident reports.
- Consumer information (e.g. billing address, account and meter numbers, etc.).

There are several ways to manage this data, from basic spreadsheet software to commercially available packages for cross connection control data management.

To facilitate data management and ensure adequate information is provided during inspections, standardized forms should be created and made available to those undertaking testing.

This requirement should be clearly communicated in your program requirements and to the persons responsible for undertaking these inspections. Forms should be submitted to the utility to confirm devices are tested annually and are in good working order.

### Public Education Plan

Successful implementation of your program will depend on how well you communicate the program requirements to your customers. Your public education plan should address the WHAT, WHO and HOW.

**WHAT** Message are you disseminating?

Think about what information you want to convey to the public about your program:

- Outline the public health risks associated with cross connections helps customers understand the importance of the program.
- Specific responsibilities of building owners to comply with the program requirements.
- Information to any guidance documents, policies or procedures created for the public.
- Regulatory requirements and authority to enforce the program requirements.

### When should backflow prevention devices be tested?

- Upon installation
- When cleaned, repaired or overhauled
- When relocated
- Annually
- Following alterations to the water supply systems upstream of the device
- Following a backflow incident

**WHO** are you trying to educate?

Are you targeting severe/high and moderate-risk building owners?

Are you going to provide all customers with some level of information about the program?

Are you going to reach out to local suppliers, local trades people, etc.?

Once you've identified your stakeholder groups, you'll want to determine **HOW** you will inform them of the program. You may choose a different approach depending on your stakeholder group or you may wish to provide all customers in your service area with information about the program.

You may also want to consider developing standard correspondence letters that you will send to building owners' identified to be severe/high and moderate-risk during your distribution system survey to outline requirements and next steps.

## Backflow Incident Response Procedure

As part of the CCC program or the utility's emergency response procedures, a backflow incident response procedure should be created to outline the actions that personnel will take in the event of a possible or suspected backflow incident.

## Concluding Remarks

If you have any questions regarding submission requirements, please do not hesitate to contact your approval engineer.

## Additional Resources

This guidance document was developed to help provide system owners' with an overview of program requirements with the understanding that each system's CCC plan and program will differ. The American Water Works Association has developed many resources to assist in developing detailed plans such as the "AWWA Canadian Cross-Connection Control Manual".

## Appendix A: Hazard Classification Framework

Risk Classification	Definition	Example of Facilities
<b>Severe/High</b>	Any type of cross-connection or potential cross-connection involving water that has additives or substances that under any concentration can create a danger to health and is likely to result in serious injury or death.	Hospitals, operating, labs, mortuary facilities, plants using radioactive material, petroleum processing and storage facilities, chemical or plating plants, commercial laundries, sewage, automotive shops, dry cleaners, car washes plants, food and beverage processing plants, premises where access is restricted, dockside facilities for ships, premises with sprinkler systems with glycol loops.
<b>Moderate</b>	Any minor hazard connection that has a low probability of becoming a severe hazard.	Office buildings, multi-service interconnected facilities, schools, colleges, shopping malls, multi-tenant single service facilities, premises with sprinklers (no glycol), restaurants.
<b>Minor</b>	Any cross-connection or potential cross connection that constitutes only a nuisance and that results in a reduction in only aesthetic quality of water (color, odor, or taste with little to no health effects).	

Note: For complete list of facilities and their risk categorization, consult the most recent CSA B64.10.

