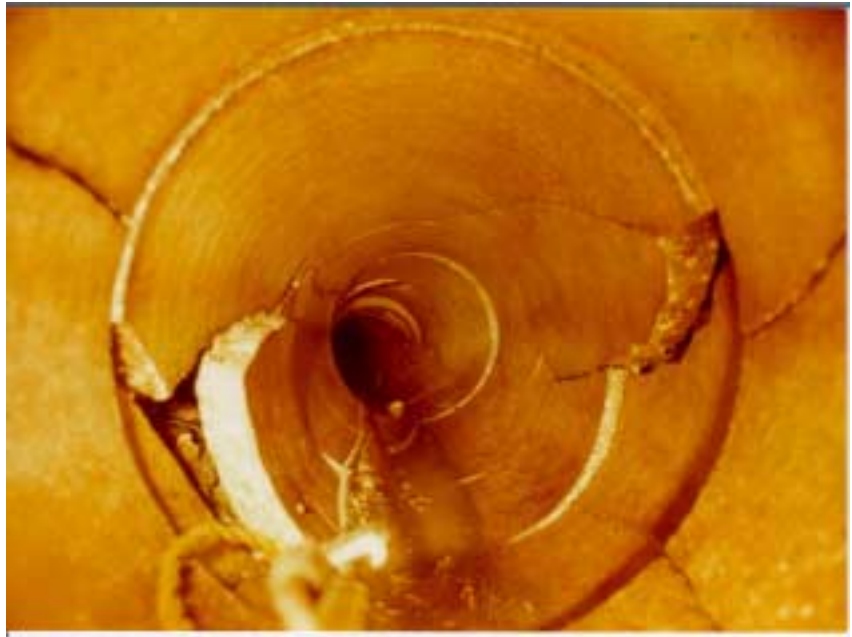


Conservation
Preservation
Restoration

**A Nine Step CPR Plan
For Ontario's Water and Sewage Systems**



Ontario Sewer and Watermain Construction Association

January, 2001

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Introduction

The Ontario Sewer and Watermain Construction Association (OSWCA) represents over 700 companies that supply and install the vast underground network of pipes that bring clean water to and take dirty water away from the residents of Ontario. With its origins dating back to the mid-1950's, the OSWCA was one of the first provincial organizations concerned with the safe and secure delivery of potable water to the public, a concern that is front and centre for the Association to this day.

The OSWCA is pleased to present *A Nine Step CPR Plan for Ontario's Water and Sewage Systems*. In developing the Plan, the OSWCA has borrowed a concept first put forward by the late David Brower, the man the New York Times described as the most effective environmental activist in the world. David Brower advocated CPR – conservation, preservation, and restoration – for the earth. The OSWCA is advocating CPR for our water and sewage systems.

The purpose of the Plan is to provide a framework for discussion, and hopefully consensus, about what the OSWCA believes needs to be done to assure the long-term conservation, preservation and restoration of Ontario's water and sewage infrastructure.

Current Situation

Nearly every aspect of our daily lives depends, in some way, on our municipal water and sewage infrastructure. Over the past fifty years, great strides have been made in establishing water and sewage systems such that almost 100% of all urban areas in the province are serviced. In 1995, municipal water and sewage infrastructure in Ontario was estimated to be worth \$50 billion, \$35 billion of which represents below-ground facilities such as pipes¹. Yet, in spite of all the funds that have been spent, many treatment plants and underground pipes are now in dire need of repair.

Two main reasons are often cited for the deterioration of our water and sewage systems:

- 1. Under Investment**

Capital shortfalls over the past two decades have led to rapid deterioration of infrastructure². According to the Ministry of the Environment's own 1995 Needs Study, the capital required for *rehabilitation of existing water and sewage infrastructure alone* amounts to over \$3 billion, and this amount does not include costs required to fix combined sewers in many older communities; costs that may arise from new regulations; the cost of water metering; stormwater management costs; or the cost to service new development³.

- 2. Tendency to defer repairs in favour of other projects or reduced spending**

Based on media accounts from across the province, deferral appears to be a management strategy that many municipalities are adopting. The trend is borne out by examining annual municipal per household spending for water and sewage infrastructure, which has essentially remained the same for the last ten years.

The crisis facing Ontario's water and sewage systems today was foretold by James W. MacLaren, one of the pioneers of water and sewage engineering in Canada. In speaking at the Association's annual general meeting in 1994, Mr. MacLaren warned that many municipal water supply and wastewater management systems in Ontario had deteriorated dramatically due to deferred maintenance, which in turn was producing unreliable water quality, and was too frequently exacerbated by under-priced services.

The OSWCA concurs, and is advocating a course of action that focuses on:

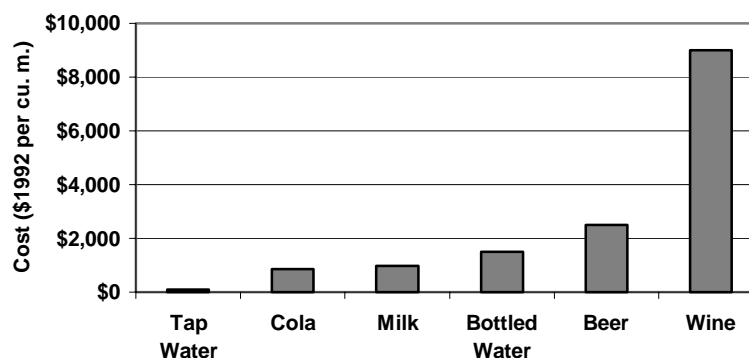
- **Conserving** existing resources;
- **Preserving** core infrastructure; and
- **Restoring** confidence in water distribution systems in Ontario.

Everyone in Ontario shares one common goal – clean, safe drinking water. The OSWCA's *Nine Step CPR Plan for Ontario's Water and Sewage Systems* is a remedy for nursing our ailing infrastructure back to health.

Step 1: Full Cost Accounting of Water and Sewage Services

Full cost accounting and full cost pricing should be adopted as the standard for water and sewage systems and services in Ontario.

Water rates in Ontario are significantly below cost. This is reflected in an Environment Canada study⁴ of municipal water rates for twelve major industrialized countries that found the average Canadian water rate to be just 36¢ per 1000 litres, significantly below other jurisdictions. Biennial surveys⁵ conducted by the Ontario Water Works Association show similar results. As shown in Figure 1, Ontarians appear to be willing to pay more for liquor than for clean drinking water.



**Figure 1. Typical prices for popular beverages
(from Tate and Lacelle, 1995)**

The main reason why Ontario water rates are low is because municipalities are not billing consumers for the full cost of water treatment and supply⁶. As well, water use is not universally metered, and where water charges are based on a “flat rate”, the rate may not cover the full cost of the service. The situation for sewage collection, treatment and disposal is worse, because the majority of Ontario municipalities rely on a sewer surcharge on the water bill⁷, a dollar amount that is typically calculated as a percentage of the water bill and has no correlation with the cost to provide sewage services. The result is an under-funded water and sewage system that is failing to meet society’s needs.

Despite the fact that delivery of water and sewage services in Ontario is a municipal responsibility, years of provincial and federal government subsidies have created an expectation among municipalities that financing water and sewage infrastructure is a shared responsibility. The OSWCA is not aware of a single municipality in Ontario that has paid for its water or sewage infrastructure entirely on its own. The same financial assistance programs that have helped to build Ontario's water and sewage systems have had the unintentional effect of suppressing the true costs, such that services are under-priced and it is questionable whether the public or municipalities know how much it truly costs to deliver high quality drinking water or to adequately treat sewage.

Full cost accounting is a method by which all monetary costs of resources used, committed, or required in the future, for water treatment and supply and sewage collection, treatment and disposal are taken into consideration. Full cost accounting has a number of benefits:

- Greater consumer awareness about the value of water, and about how water and sewage revenues are spent;
- Increased water conservation, particularly when alternative rate structures such as increasing blocks are used;

- Greater ability for municipalities to identify opportunities for cost savings;
- Less fiscal pressure on senior levels of government;
- Long-term financial sustainability of Ontario's water infrastructure assets; and
- A fully transparent system that forces municipalities to raise what is needed to ensure water quality and spend what is raised.

While it is important to note that there is debate about full cost pricing, the debate surrounds the *definition*, rather than the intent.

At a minimum we would propose that full cost means adopting a method such as the following:

- Determining *total cash expenditures* by adding together all direct and indirect overhead costs and operating costs of the works;
- Determining *total debt repayment costs* reasonably attributable to the works;
- Determining a *total sustainability allowance* for the works by adding together a reasonable total allowance for renewal and replacement and a reasonable total allowance for improvement; and
- Determining the *total annual sustaining costs* by adding together *total cash expenditures*; *total debt repayment costs*; and the *total sustainability allowance*; each as determined above.

Table 1 presents a list of cost categories that should be considered for inclusion in any full cost accounting framework.

Table 1. Costs to Consider for Full Cost Accounting^{8,9}

Direct Costs	Indirect Costs
<ul style="list-style-type: none"> • Source of supply • Land Acquisition • Water Treatment and Distribution • Sewage Collection, Treatment • Sludge Disposal • Interest Payments • Repair, replacement, decommissioning 	<ul style="list-style-type: none"> • Administration • Billing and collection • Customer service • Accounting and finance • Fleet services

As well, moving to full cost accounting will require municipalities to move away from cash-based accounting practices in which assets are recorded as expenditures, to an asset-based system that places a value on each asset and depreciates the asset in a systematic manner over a defined number of years, thereby allowing for identification of the required revenue needed for eventual replacement¹⁰.

Recovering the full cost to treat and distribute drinking water and to collect and treat sewage would lead to a financially sustainable system, where costs are transparent, and consumers know what they are paying for, and why. Without full-cost pricing, there is little hope of being able to pay for much-needed repair and replacement of aging infrastructure, for ongoing operations and maintenance, or for the ancillary

support services that ensure a clean water supply. History has demonstrated that as long as there is no relationship between cost and price, water and sewage works will be underfunded, for what is out of sight is often out of mind.

Step 2: Transition and Mitigation Strategies for Municipalities

The OSWCA recognizes that, after years of reliance on various federal and provincial government subsidies, moving to financial self-sufficiency for Ontario's water and sewage systems is not going to occur over night. That is why the OSWCA recommends a *program of transition assistance* that would focus on promoting full cost recovery and other appropriate management practices that ensure long-term sustainability.

OSWCA has recommended that the government work with municipalities to ensure that they have a series of tools that will assist them in moving to full cost pricing in an orderly and effective manner.

Some of the mitigation strategies could include financial tools and expertise such as:

- Revenue Bonds.
- Borrowing Authority
- Municipal Tax Points or Taxing Authority (dedicated to water/sewer).
- Revenue Pools (Municipal Financing Authority).
- Consulting expertise to assist in financial restructuring and any negotiations.
- Engineering studies to assess state of municipal infrastructure.

"This state of affairs is not sustainable. Eventually, the costs to future generations who will be saddled with contaminated and degraded waters will far outweigh the smaller cost of taking action now to utilize our water resources wisely"

Canadian Environmental Law Association
A Sustainable Water Strategy for Ontario, 1999

We would also propose that the Province establish a Transition Fund to assist in immediate upgrading of facilities while municipalities move to full cost pricing. This would enable a reasonable phase-in period (5-8 years) and would serve to ease any financial burden to individual ratepayers.

It is envisioned that the *Transition Program* would be set up so as to provide a strong incentive for municipalities to adopt sustainable practices by rewarding proactive, forward-thinking municipalities. For example, funding under the program could be set up to reward municipalities that move quickly to:

- implement measures to move toward accounting for the true cost of water and sewage services;
- install water meters;
- establish separate water and sewage billing, showing a breakdown of costs; and,
- pass municipal by-laws that encourage sound accounting practices for water and sewage works and services.

OSWCA would propose that the current funds allocated to the OSTAR program be rolled into a dedicated sewer and water fund of \$160 million per year for the duration of the phase-in period (5-8 years). This could be done on a declining basis as more municipalities move to full cost pricing. Since the current funds allocated under OSTAR are \$240 million over the next two years this would represent an additional allocation of only \$40 million in each of the first two years.

We would hope and expect that the federal government would also contribute to this fund.

Step 3: Dedicated Water and Sewage Reserve Accounts

Municipalities should set aside revenues in dedicated reserve accounts in order to build up the funds needed to deal with on-going maintenance, repair and eventual replacement of Ontario's water and sewage infrastructure.

Even though Ontario's population has been growing steadily, municipal capital expenditures on water and sewage infrastructure have remained essentially the same over the last ten years, averaging \$210 per household per year.

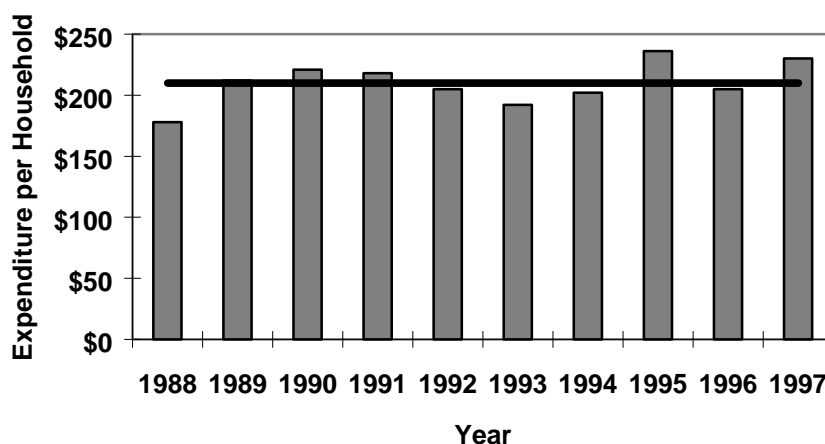


Figure 2. Ontario municipal capital expenditures on water and sewage infrastructure per household for the period 1988 to 1997¹¹

Municipal spending on water and sewage systems has not kept pace with demand. This lack of spending may have contributed to the deficiencies found in over half of the province's 645 water treatment facilities identified in the Ontario Ministry of the Environment's inspections conducted during the summer of 2000.

The cost for modern water systems is currently estimated to be approximately \$4,000 per capita¹² (not including sewage), making water systems significantly more capital intensive than other utilities such as electricity, telecommunications and natural gas. Saving money to pay for repair and replacement can seem an onerous task. A reserve account dedicated to financing water and sewage systems can help. Municipal revenues intended for future capital projects would be placed in a dedicated water and sewage savings account and allowed to accumulate until needed.

In the same way that retirement savings plans are used to assure future financial security, and education savings plans are used as a way to pay for future education costs, dedicated municipal water and sewage savings plans would be used to finance future water and sewage systems costs. In the event of a crisis, municipalities without dedicated reserve accounts may have no ready means to pay the relatively high one-time costs of correction.

Dedicated savings accounts could act as RRSPs – Repair and Replacement Savings Plans – to allow municipalities to save for the future renewal of water and sewage systems.

As a general rule of thumb, a municipality should consider setting aside 1% to 2 % of the current value of water and sewage system assets, including all above- and below-ground components, per year. Full life cycle costs, including maintenance, repair and replacement, should be considered when calculating current value¹³, to ensure that sufficient funds are set aside.

Step 4: Asset Inventory and Assessment

Prudent water and sewage system management begins with an inventory of assets and an assessment of the condition of each.

Unfortunately, with few exceptions, municipalities do not know the condition of water or sewage system components, particularly underground pipes. We are encouraged by the recent announcements by the SuperBuild Agency to conduct a province wide examination of water and sewer infrastructure needs. It is, in our view, imperative that municipalities be required to conduct regular audits of their water and sewage infrastructure and report such information to a provincial overseeing body.

An inventory provides municipalities with details (such as size) about individual water and sewage system components and where the components are located. Condition assessment takes the inventory one step further, providing municipalities with information about the integrity of each component, including its anticipated service life and expected replacement value. Information obtained during inventory development and condition assessment can provide a “snapshot” of strengths and weaknesses within water and sewage systems. Appropriate management strategies can then be adopted.

Recognition about the usefulness of asset inventories and condition assessments is growing.

For example, one of the requirements of the new *Drinking Water Protection Regulation* is for each municipality to have a professional engineer report on the condition of waterworks. Although the information in the engineer’s reports is intended to assist the MOE to update Certificates of Approval, the ready availability of the information presents an excellent opportunity to re-establish a province-wide inventory. The provincial government should consider expanding the condition assessment (1) to include underground systems and (2) by requiring annual reporting so that information is up-to-date. This is the approach that is being taken in the United States, where all state and local governments are now required by law to account for their infrastructure assets and provide an annual report. The U.S. law was designed to improve the way in which public accounts are reported and to more clearly show the real cost of the services being provided¹⁴.

Until such time as inventories and condition assessments become routine, municipalities’ assurances about water system integrity will continue to be greeted with scepticism.

Step 5: Integrated Water Policies and Planning

The need for effective, coordinated water management has never been greater.

Testimony during the Walkerton Inquiry demonstrated just how fragmented water management is in Ontario: various ministries within the provincial government have authority over different areas of water management, including the Ministry of the Environment, the Ministry of Natural Resources, the Ministry of Agriculture, Food and Rural Affairs, as do other agencies, such as conservation authorities, public health units, and the Ontario Clean Water Agency. Even within a single organization, there may be different departments managing different aspects of water.

According to a study done by the Canadian Environmental Law Association (CELA), the “result of this ad-hoc approach to decision-making is a hodgepodge of policies aimed at alleviating specific problems as they arise instead of an integrated and comprehensive water policy that provides consistent guidance to all public decision-makers and stresses the protection of water”¹⁵.

The Association of Municipalities of Ontario takes the sentiments expressed by CELA one step further, stating that “water protection policy requires a comprehensive water protection legislation that departs from the current unfocused approach to decision-making and the current array of policies and programs aimed at alleviating specific problems”¹⁶.

“Ontario needs a comprehensive, sustainable water management strategy that is applied consistently to all decisions regarding water quality and quantity”.

Association of Municipalities of Ontario (2000)

The provincial government has long recognized the need for, and benefits of, coordinated water management. The work done by the Ontario Water Resources Commission to establish large water and sewage systems to serve multiple municipalities is but one example¹⁷. By the late 1980's, partly in recognition of the fragmentation under which wa-

ter policies and planning were suffering, the provincial government began conceptual development of a self-financing “super” agency to, among others, provide comprehensive province-wide planning on a watershed basis in order to promote effective and efficient municipal servicing. The provincial government went so far as to announce the new agency in the provincial budget of April 24, 1990.

The “super” agency was never initiated, but there is a persistent need for the province to play a stronger role in the regulation and enforcement of standards for the operations and maintenance of water and sewage systems.

Step 6: Long Term Capital Planning for Water and Sewage

Municipalities should be required to publicly report their long-range capital plans for water and sewage infrastructure, and the rationale for, and impacts of, not proceeding with planned expenditures.

Long-term capital planning, in all but the largest municipalities, is often an exercise in wishful thinking. In times of fiscal constraint, municipal councils frequently choose to defer planned waterworks activities as a way of achieving savings. This is risky. By deferring maintenance or planned repairs, municipalities run the risk of compounding existing problems, and then finding that the cost is so high that correcting the problem is unaffordable. Deferral also sends a message that planned water and sewage system rehabilitation, repair and replacement are not priorities; the message is one of complacency. Complacency can lead to crisis.

Municipalities have a variety of ways to establish capital plans – based on historical expenditures, public demand or complaints, maintaining a desired level of service, optimal level of service, or on a municipality's ability to pay. The most common approach, particularly for smaller municipalities, is to use historical expenditures. However, it doesn't make sense to base capital plans on costs that are twenty, thirty or 50 years old, which can be the service life for many water and sewage system components.

The Ministry of Municipal Affairs recently operationalized the concept of municipal "public report cards" as a means of documenting how well municipalities deliver key services. The report cards will include information about the quality of drinking water, the cost of delivery, as well as data on sewer backups and tests at treatment plants. But more accountability is needed. Specifically, if municipal capital planning is to be effective and deliver value to its customers, there must be a mechanism to ensure deferral, as a means of financial management, becomes the exception, rather than the norm.

Step 7: Legislative Amendments

“A body in uniform motion will remain in uniform motion until acted upon by a force”

- Isaac Newton

The history of water and sewage management in Ontario has shown that legislation is the most effective way to ensure municipalities "do what's right".

The provincial government has used a variety of tools to induce municipalities to cooperate. One way has been through financial incentives, such as funding to build water and sewage works. Another has been through the use of provincial guidelines and policies, but these have limited statutory power, are open to interpretation and challenge, and are usually unenforceable. Then, there is legislation.

In the absence of legislation, municipalities, in general, have shown a reluctance to implement provincial policies. For example, in response to health concerns in the early 1930's, the Department of Health was given responsibility for issuing 'mandatory orders' to compel municipalities to chlorinate water supplies, or install water filtration plants. Some municipalities strenuously opposed these orders. In one instance, the entire council resigned, rather than comply with the Department's order¹⁸. This municipal foot-dragging led, in part, to the passage of what eventually became the *Ontario Water Resources Act*, the primary legislation protecting our water resources. Other examples of provincial legislation enacted to compel municipalities to act include the *Regional Municipalities Act*, enacted to encourage sharing of services, the new *Municipal Act*, enacted to describe the realignment of local services and define municipal amalgamations, and, more recently, the *Drinking Water Protection Act* which is designed to safeguard public health by increasing accountability for the quality of Ontario's drinking water.

We would propose the enactment of legislation that would promote the safe and reliable supply of water and waste water services by requiring the full costs of operating, repairing, maintaining, renewing, replacing, improving and upgrading water works and sewage works be recovered from users.

Municipalities would be required within five years to enact by-laws which determine the rates to be charged to users based upon background studies completed by qualified experts. Such background studies would include, among other things, assessments of existing water works and sewage works, required improvements, and the anticipated cost of maintaining and upgrading water and sewage services.

A method of accruing and accounting for the full costs of water works and sewage works would be provided in the legislation, with the Minister having the authority to supplement the statutory method and approve or prescribe alternative methods which achieve the objectives of the Act.

Municipal by-laws establishing separate annual water service rates and sewage service rates for users would be required, and such by-laws would be subject to review by the Ontario Municipal Board and the Ministry of Municipal Affairs and Housing. Once finalised, the rates set out by by-law would be collected from users, who would have a right to file complaints if the rates are wrongly applied. Where the rates required for full cost recovery would exceed existing rates, municipalities would be permitted to phase-in the new rates over a three year period.

To ensure that funds collected from users for the purposes of water and sewage services are used for such purposes, municipalities would be required to maintain amounts collected in separate reserve funds which can only be used for expenditures relating to water and sewage services.

The Minister of Municipal Affairs and Housing would be given the power to make regulations which are considered necessary or expedient to address particular circumstances and attain the objectives of the Act.

If municipal and provincial levels of government are to have any hope of restoring Ontario's water and sewage infrastructure, then municipalities should be legally required to establish full cost pricing and dedicated reserve accounts. By enacting legislation, municipalities will be compelled to implement a means for financing future water infrastructure costs, and the provincial government will be sending municipalities a positive message about the importance of prudent fiscal management. More important, imposing full cost accounting and dedicated reserve accounts will instil a "value" on water and move Ontario away from the current "water is free" attitude. By enshrining these fundamental requirements in legislation, municipalities will not only have the authority they need to implement full cost pricing but the political direction to do so as well.

Step 8: Independent Oversight

The OSWCA advocates establishing a municipal watchdog to review municipal practices in order to ensure taxpayer dollars are being managed wisely and in a way that protects and enhances Ontario's water and sewage systems.

Currently, businesses in Ontario are subject to a plethora of oversight legislation and regulation, through, for example, the Ministries of Labour and Consumer and Commercial Relations, to name two. There does not exist a similar degree of oversight over municipal water and sewage practices.

Both the Ontario and federal governments have auditors who annually scrutinize the spending of government departments. The role of auditor has evolved from ensuring proper financial management to evaluating programs to determine whether the public is receiving value for money.

Currently, many audits are undertaken only when a concern is identified. Such was the case with the province-wide inspection of water treatment facilities that took place during the summer of 2000. The results of the inspections were made public, and, as a result, Ontarians became aware of inefficiencies and inadequacies of existing municipal water management procedures. Specifically, the inspections revealed that one out of every two municipal water treatment plants (over half (357) of the 645 facilities) in the province was found to be deficient. The four most common deficiencies were (1) insufficient number of bacteriological or chemical samples, (2) inadequate maintenance of disinfection equipment, (3) inability to comply with minimal treatment guidelines, and (4) inadequate operator training. No such accounting or inspection of underground infrastructure (water distribution and sewage collection pipes) has yet been done.

An annual audit of municipal activities related to water and sewage system management, such as comparing capital, operations and maintenance spending against plan, is a proactive measure designed to identify inadequacies long before a crisis occurs. And the presence of a watch-dog could provide the public with a conduit for bringing systemic incompetence or inefficiencies out into the open¹⁹.

Some municipalities may be publicly embarrassed by the results of annual audits. But embarrassment is a small price to pay for ensuring the safety of Ontario's drinking water. The need is clear – Ontario needs an independent municipal auditor.

Step 9: Endorsement and Action

Imagine, for a moment, that stakeholders within the province come to a consensus about the root causes of our water management problems and develop a course of action to remedy the problems. The stakeholders present the plan to the Premier of Ontario, who gives his support to the plan. An educational package based on the plan is distributed to every municipality, school, and household in the province, so that people can understand the importance, and cost, of clean water. Then the provincial government and all stakeholders publicly ratify the plan, and action begins. While this scenario may read like a fairy tale, it can become reality.

It happened for the entire nation of Sweden in 1989, when this approach was applied to environmental stewardship. Karl-Henrik Robèrt, a medical doctor frustrated by political indifference, was the catalyst behind The Natural Step® program, and single-handedly altered the way a nation confronted environmental and economic sustainability. He was concerned about the plethora of debate and the lack of action and developed his Natural Step Program in order to provide a framework to help governments, businesses, academia and individuals change their activities to become more sustainable.

Establishing a framework for building consensus and adopting an action plan for ensuring long term sustainability are approaches we need to take to solve Ontario's water and sewage infrastructure crisis.

The events of the Walkerton tragedy have forced us to focus on the fragility of municipal water systems and how these systems are managed. The consequences of complacency are clear. If nothing is done or we simply continue to debate the issues, we will be putting our water and sewage systems, and ourselves, at risk. And we will have only ourselves to blame.

The OSWCA's Nine Step CPR Plan offers an opportunity to lead discussion away from debate to consensus on action. By focusing on:

- **Conserving** our resources;
- **Preserving** core infrastructure; and
- **Restoring** confidence in water distribution systems in Ontario,

we will all be taking a natural step toward nursing our ailing water and sewage systems back to health.

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