

**Best  
Management  
Practices**

**Water Distribution System  
Renewal Planning**

Developed by



**BCWWA**

for



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# Water Distribution System Renewal Planning

Your water system—whether large or small—must be effectively and efficiently maintained, rehabilitated, and replaced to guarantee your customers an abundant supply of safe and affordable water. It's important, therefore, to understand how your system ages and deteriorates and to develop appropriate response strategies.

## What is system renewal planning?

Water distribution system renewal planning, often called asset management, optimizes the life-cycle value of a utility's physical (infrastructure) assets through effective maintenance, rehabilitation, and replacement programs.

*Developing a Water Distribution System Renewal Plan* outlines two complementary approaches—top-down and bottom-up. “The top-down approach is used for strategic long-term planning of policies and programs whereas the bottom-up approach is used for short-term capital planning of projects.”

The National Water and Wastewater Benchmarking Initiative's *Issue Paper on Infrastructure Reinvestment* recommends that utility managers answer the following six questions before making asset reinvestment decisions:

1. What do you own?
2. What is it worth?
3. What is the deferred maintenance?
4. What is its condition?
5. What is the remaining service life?
6. What do you fix first?

The answers, when reflected in an appropriate performance management model, will ensure an effective and affordable water distribution system.

*Developing a Water Distribution System Renewal Plan* recommends “renewal plans be reviewed every five to ten years to reflect the current condition of the system as well as the effectiveness of various renewal technologies. Municipalities should track water main break rates, water quality problems, fire flow rates, and leakage rates to establish deterioration rates and the adequacy of the program.”

## Why should BMPs be applied to system renewal planning?

BMPs will help managers address the multiple and often conflicting objectives that infrastructure must

## Information Links

[\*Developing a Water Distribution System Renewal Plan: A Best Practice by the National Guide to Sustainable Municipal Infrastructure\*](#)

[\*National Water and Wastewater Benchmarking Initiative Issue Paper on Infrastructure Reinvestment \(2003\)\*](#)

(PDF File)

[\*AWWA Research Foundation\*](#)

(See 'Research Projects and Topics')

meet (e.g. benefit and cost), and the varied interests of diverse stakeholders with differing opinions on what represents good infrastructure performance.

More specifically, a water distribution system renewal plan that reflects BMPs:

- **increases protection of potable water supply;**
- **reduces risk to public health;**
- **increases disinfection efficiency;**
- **decreases reactive maintenance;**
- **reduces system water loss and resulting lost revenues;**
- **improves approach to upgrade of other appurtenances (e.g. valves, meters);**
- **reflects adequate life-cycle costs;**
- **supports funding requests;**
- **minimizes service interruptions;**
- **maintains system hydraulics;**
- **reduces energy costs;**
- **increases reliability of fire protection (stabilizes insurance rates);**
- **increases customer confidence and understanding of the value of water;**
- **provides opportunity to cooperate with other utilities; and**
- **reduces water system loss and protects the environment.**

A water distribution system renewal plan that reflects BMPs also helps build consistency throughout the province.

## What BMPs should be applied to small systems?

Small water systems (e.g. those servicing a trailer park or subdivision) can implement a renewal plan that includes the following steps:

1. Research successful renewal planning programs implemented by other small systems.
2. Complete an inventory of the existing infrastructure (e.g. materials, age).
3. Identify current replacement costs and estimated time to replacement.
4. Identify potential cost for repairing a catastrophic failure to establish minimum reserve fund level.
5. Set up a reserve fund and begin setting aside money to replace infrastructure.
6. Document break and repair records to understand deterioration of the system.
7. Consider system modifications for flushing, looping, and water quality monitoring.
8. Update the five-year capital plan and operational budget.
9. Prepare drawings for current-year capital improvements and submit Construction Permit application to Drinking Water Officer.
10. Replace infrastructure before a catastrophic failure occurs.

*\*Repeat steps 6 to 10 annually*

### *If you need help...*

#### **Small Systems**

- **Coastal Water Suppliers Association**  
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- **Small Water Users Association**  
Denny Ross-Smith  
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- **Water Supply Association of BC**  
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## What BMPs should be applied to larger systems?

### **1. Conduct Initial Research**

- Research successful water system renewal plans in other communities
- Explore potential scope and philosophy

### **2. Build Program Framework**

- Identify objectives and targets
- Determine governance approach
- Identify participants and their roles
- Outline responsibilities
- Develop procedures/templates
- Create Budget
- Set schedule
- Establish authority
- Prepare business plan to garner support and funding
- Evaluate and refine plan (ongoing)

### **3. Garner Support and Funding**

- Present business plan to senior staff and council or board (include rationale, liability considerations, recommended approach and funding requirements)
- Provide frequent updates (ongoing)

### **4. Conduct Inventory and Condition Assessment**

- Gather appropriate information
  - materials
  - age
  - size
  - leak history
  - soil conditions
  - financial impacts (e.g. difficult locations)
  - environmental impacts (e.g. under stream)
  - water quality impacts (e.g. areas requiring frequent flushing)
  - complaint history
- Refer to hydraulic model to determine conditions and limitations

### **5. Develop Ranking System**

- Consider service levels (e.g. do they meet current requirements?)
- Review pipe-specific information gathered during previous step
- Consider methods of ranking used in other jurisdictions
- Develop replacement schedule
- Develop annual budget and long-range plan
- Conduct sensitivity analysis

## 6. Create Communication Plan and Materials

- Identify internal and external audiences' specific communication needs
- Prepare a written plan
- Educate all appropriate staff about the plan
- Access/prepare information and education materials for external audiences
- Educate external audiences
- Evaluate and refine plan (ongoing)

## 7. Conduct Annual Review and Update

### **Recommended Reading...**

#### ***Assessing the Future:***

#### ***Water Utility Infrastructure Management***

AWWA No. 20484

(303-794-7711) [www.awwa.org](http://www.awwa.org)

#### ***Rehabilitation of Water Mains (Second Edition)***

AWWA No. 30028

(303-794-7711) [www.awwa.org](http://www.awwa.org)

#### ***Accounting for Infrastructure in the Public Sector***

The Canadian Institute of Chartered Accountants, 2002

### ***If you need help...***

#### **Large Systems**

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