

An aerial photograph of Toronto, Ontario, Canada, showing a dense urban skyline with numerous skyscrapers, including the prominent CN Tower. The city is situated along the waterfront of Lake Ontario, with a marina filled with sailboats in the foreground. The sky is a clear, vibrant blue with a few wispy clouds. The overall scene is bright and modern, representing a major metropolitan area.

# ALTRA

TRENCHLESS WATER MAIN RENEWAL

THE FIELD-PROVEN  
SOLUTION FOR RESILIENT  
WATER INFRASTRUCTURE

# THE MOST COMPREHENSIVE AND PROVEN EXPERIENCE IN NORTH AMERICA

Municipalities across the world are experiencing challenges in maintaining aging infrastructure and building resiliency. This challenge is made more critical as climate change is causing increasingly severe environmental conditions and events that threaten water mains infrastructure. Water mains renewal extends the life of existing infrastructure at a reduced cost with minimal disruption to our communities. Most of all, the volume of infrastructure renewal that can be delivered annually far exceeds that of traditional approaches, such as the replacement of these assets.

Over the past 20 years, ALTRA has become recognized as the best technique to renew aging water mains. More than 350 North American cities and more than 2,400 km of water mains have been successfully lined with ALTRA. The next generation of ALTRA Proven Water Technology has been gaining a lot of attention recently, following rigorous testing at Cornell University's Geotechnical Lifelines Large-Scale Testing Facility that established the technology as the only solution proven to withstand extreme seismic and extreme environmental events to protect water main infrastructure lifelines. In fact, tests proved that this solution would have easily withstood both the 1906 San Francisco Earthquake and 2010-2011 Canterbury Earthquake sequence in Christchurch, New Zealand.

INSTALLED OVER

**2,400**  
KILOMETERS

ACROSS

**350**  
CITIES IN  
NORTH  
AMERICA.

 **BEST  
MANAGED  
COMPANIES**

# DELIVERING RESILIENCE

Our field recognized technology, ALTRA10, protects and renews your drinking water infrastructure from the inside with minimal disruption to your communities.

## BENEFITS

*1,500 miles / 2,400 km installed to date:*

### PROVEN RESILIENCE

- Structural, class IV, high resiliency against extreme weather events;
- Increased pressure and flow capacity;
- Added corrosion resistance;
- Regained full structural integrity;
- 100 year life expectancy.

### ENVIRONMENTAL BENEFITS

- Elimination of risk of future water main breaks;
- Reduction of 55M m<sup>3</sup> of drinking water leaks;
- Reduction of GHG emissions by 8X.

### INSTALLATION SPEED

- One team can install up to 1.2 mile per week (depending on the diameter)

### INSTALLATION BENEFITS

- Enable work in difficult to access, ecologically sensitive or high density area (e.g., highways, etc.);
- Quick installation with minimal disruption for the community;
- Little excavation and noise leading to fewer complains from neighboring residents;
- No disturbance to adjacent infrastructures;
- Line through bends and future service taps easily performed;
- No future maintenance required;
- Replacing lead services can be done simultaneously.

### ECONOMIC CONSIDERATIONS

- Most cost effective water main infrastructure replacement methods;
- Reduction in treatment and pumping costs.

# SPEED AND EFFICIENCY

## 01. TEMPORARY BYPASS

Install temporary bypass through water meters or garden spigots

## 02. EXCAVATION

Excavate access pits at each end of the pipe section

## 03. CLEANING

Clean pipe with metal chain reamer

## 04. INSPECTION

Inspect pipe through closed-circuit television (CCTV) inspection to map the service connections

## 05. INSERTION

Insert plug in every service connection from inside the pipe using specialized robotic equipment

## 06. INJECTION

Inject epoxy into the liner on-site and pull into place

## 07. LINER FORMATION

Form the liner by sending swabs from one end to the other

## 08. CURING

Circulate hot water for curing

## 09. PRESSURE TEST

Perform hydrostatic pressure test

## 10. REINSTATE SERVICE

Reinstate service connections from inside the pipe by drilling using specialized robotic equipment


## 11. DISINFECTION AND RECONNECTION

Disinfect the pipe, test, and reconnect water distribution system

## 12. RESTORATION

Remove temporary bypass and restore site



Clean water main 

ONE TEAM CAN INSTALL UP TO  
1.2 MILES PER WEEK

# TECHNICAL SPECIFICATIONS

## ALTRA10 DIAMETERS

4-24 inches (100-600 mm)

## INSTALLATION LENGTH

Up to 1,000 feet (300 m)  
between access pits

## INSTALLATION METHOD

Pulled-in-Place Pipe (PIPP)

## OPERATING PRESSURE

Tested at greater than  
150 psi (10 bars)

## HAZEN-WILLIAMS COEFFICIENT

Greater than 120

## LINER LIFESPAN

More than 100 year life expectancy

## CLASS IV STAND-ALONE STRUCTURAL LINER

- Regained pressure and flow capacity
- Corrosion resistance
- Regained structural capacity
- Proven not to break upon hostpipe failure.

## ALTRA10 LINER

Circular woven polyester and fiberglass jacket, impregnated with epoxy resin (proprietary formulation) with fused, watertight polymeric membrane.

## A UNIQUE COMBINAISON

Technological expertise and field experience



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# CERTIFICATIONS

- Compliant with BNQ 3660-950 and NSF/ANSI/CAN 61-G standards
- Mechanical properties exceed ASTM F1216 and ASTM F1743 standards
- Tested in compliance with Australian/New Zealand 4020 drinking water standards
- Meets the Solar Impulse standards on Sustainability & Profitability



**ALTRA**



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