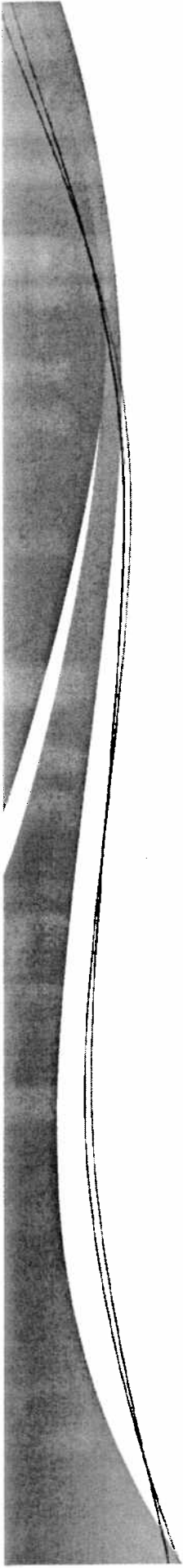


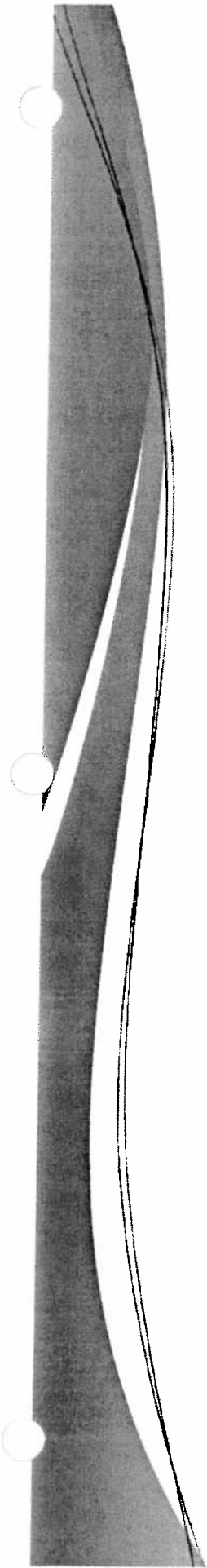
Water Balance Approach to Leakage Management

Presentation to General Committee



Agenda

1. Review Water System Overview & Strategy
2. Water Balance Approach
3. Components of Water Balance
4. Action Plans
5. Next Steps



Purpose

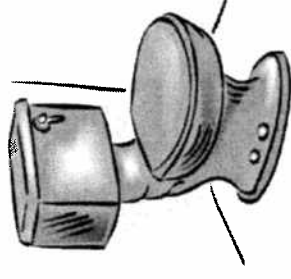
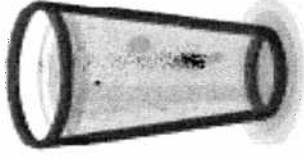
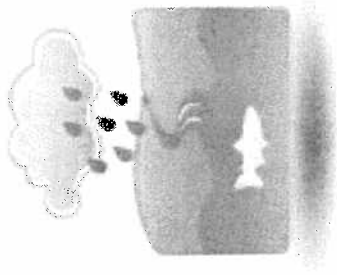
- To inform Council on the International Water Association's Water Balance program , and;
- Explain staff's approach to managing the performance of our Water System

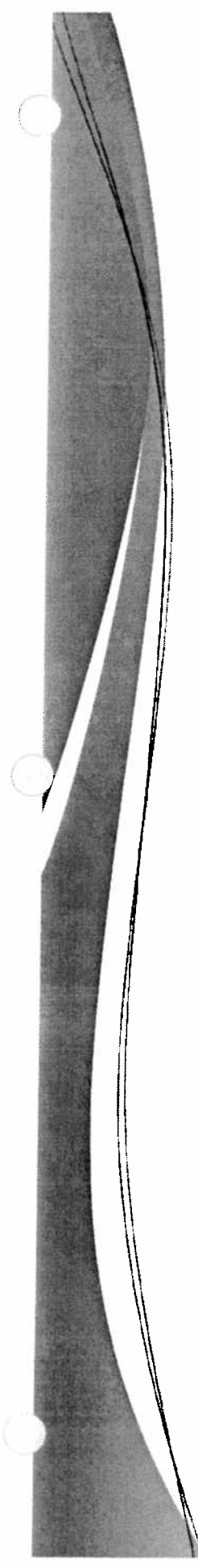


Water System Overview

Urbanized communities are supported by 3 distinct water systems:

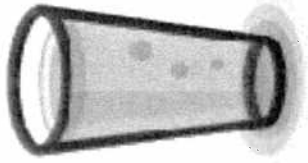
- Stormwater Management System;
- Potable Water Distribution System, and;
- Wastewater Collection System





Potable Water Distribution

- Communities require larger volumes of potable water to flourish
- Localized supply is not always possible
- Potable (treated) water is piped in from other sources to meet community demands
- **Distribution Systems must be separate from SWM systems and wastewater collection systems**





Water Distribution Strategy

Minimize impact on natural drainage system through:

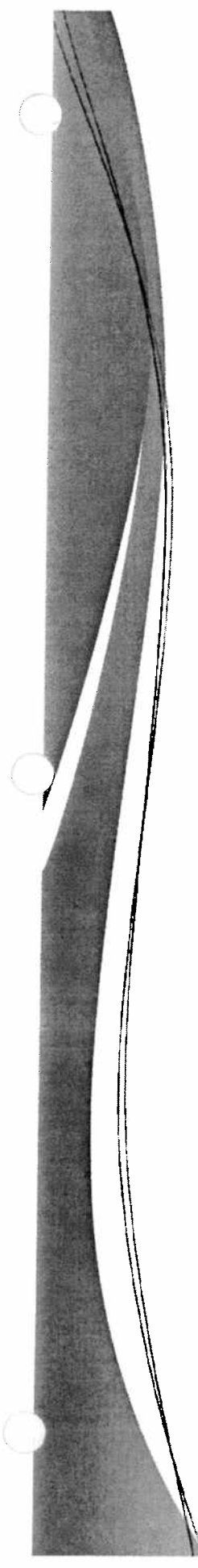
Water

- Leak Detection Programs
- Water Conservation Programs

“Keep what’s inside the pipe inside the pipe ...”

- From a Policy Perspective

Greenprint
“Water is a Resource”



IWA's Water Balance Approach

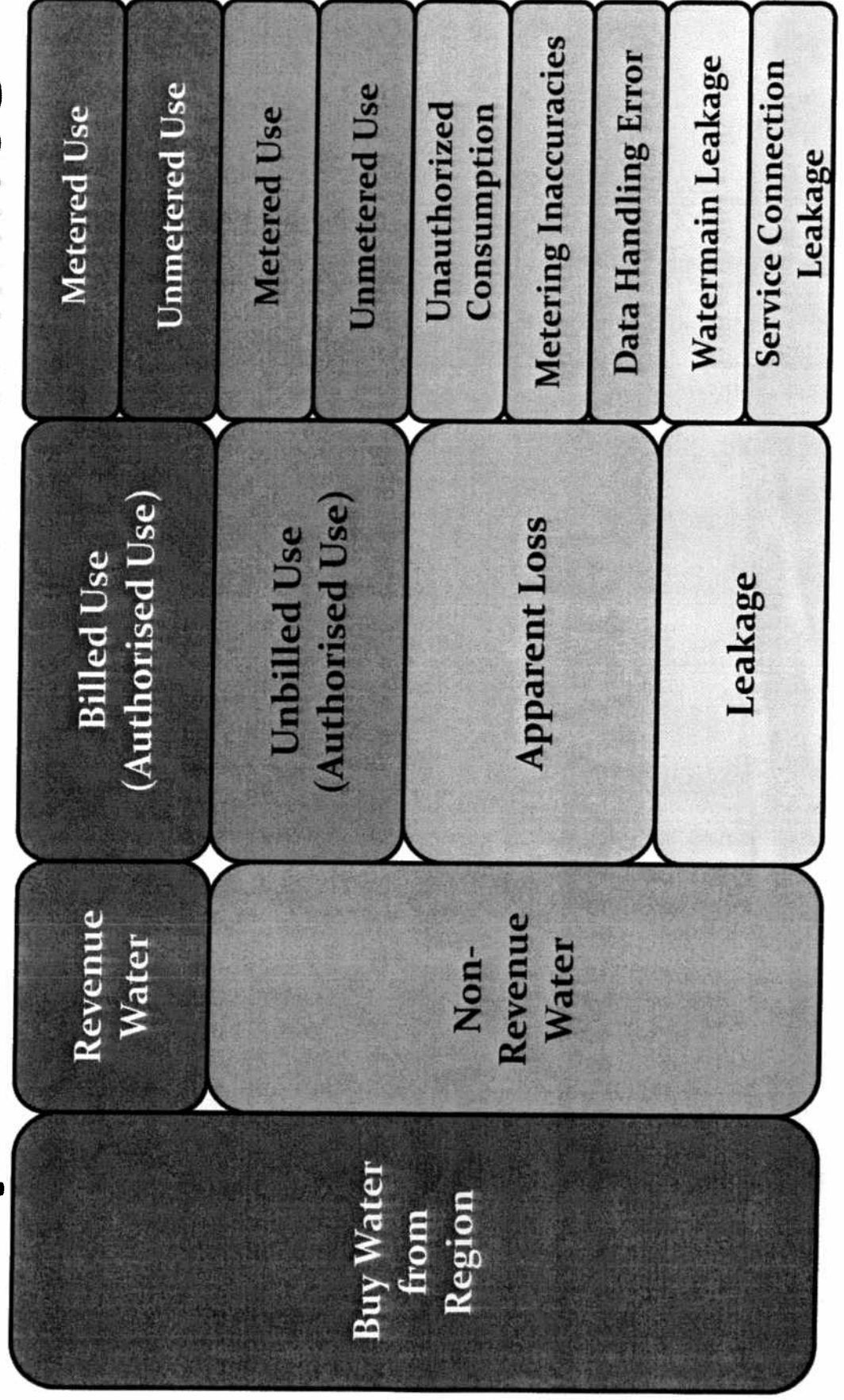
- Developed in 2000 by International Water Association (IWA) as a Best Practice and Performance Indicator
- Since 2000, recognized and adopted internationally as a 'best practice' by a number of countries and water utilities throughout the world
- In 2003 the Government of Canada, through the FCM and NRC, developed the "National Guide to Sustainable Municipal Infrastructure" (InfraGuide) and was the first North American Best Practice Manual to recommend the IWA Water Balance



What is the Water Balance?

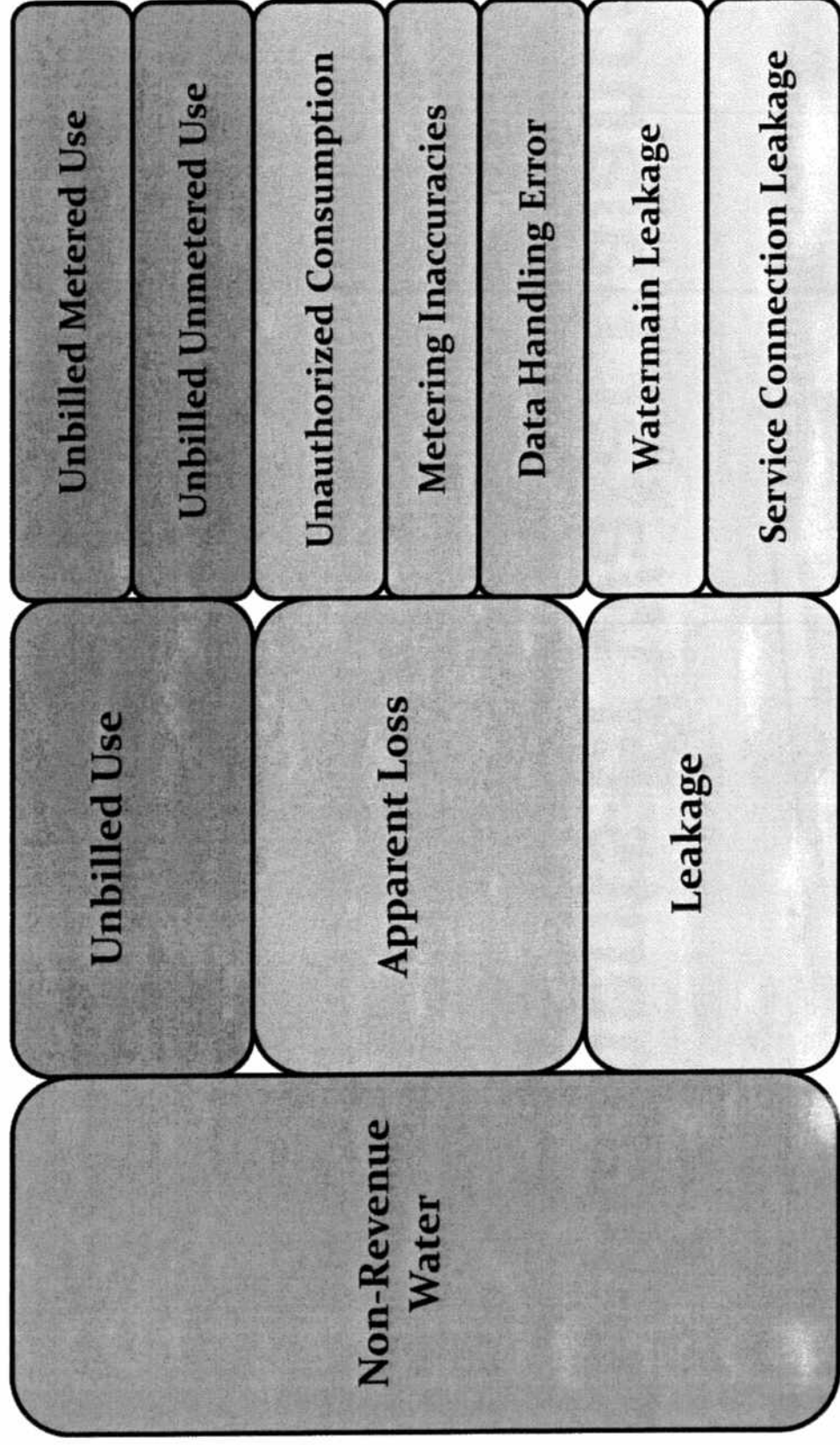
- A systematic approach to quantify the components of ‘non-revenue’ water
- Develops Performance Indicator (PI) for financial, operational, and resource management comparisons
- Water Balance is the first step and provides the basic data to develop the IWA’s Infrastructure Leakage Index (ILI)
- ILI is used to benchmark operational performance of water systems worldwide (Presentation in January)

Components of Water Balance





Non-Revenue Water



Non Revenue Water - Unbilled Use

Examples

- Waterworks Operational Uses
 - Flushing – Hydrant, Dead End, Sewer
 - Testing and Sampling
- Development/Building Water
- Fire Fighting & Fire Training
- Some Town Facilities
- Town Operational Uses
- Irrigation, Sportsfields etc.

Unbilled Metered Use

Unbilled Unmetered
Use

ACTION PLAN –

- Detail and document all Unbilled Uses
- Install metering where possible and record readings
- Prepare estimates for items that can't be metered

Non-Revenue Water – Apparent Loss

Examples

Unauthorized Consumption

- Theft/Vandalism/Illegal Connections/Meter By-passes

Metering Inaccuracies

- Over 73,000 water meters – Residential, ICI, Region, Toronto

Data Handling Error

- Data errors in transfer of readings, billings

ACTION PLAN

- Improved By-laws and enforcement of theft and vandalism
- Meter Management Program for Residential and ICI meters
- Metering and Billing Audit of Markham and Region systems
- Town currently piloting 'smart' metering technologies

Non- Revenue Water - Leakage

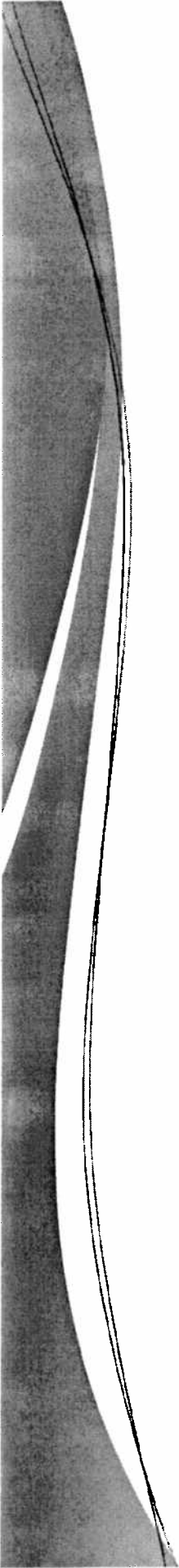
Watermain Leakage

Service Connection
Leakage

- Lost through leaks, bursts and overflows at reservoirs, mains, or service connections, up to the point of customer metering
- Markham and Regional
- Leakage = Non-Revenue Water – Unbilled Use - Apparent Loss

ACTION PLAN

- Leakage Control Program
 - District and Sector Management Areas (DMA's and SMA's)
 - Sounding and Acoustic Studies of high potential areas
 - Cathodic Protection of Iron Mains
 - Work with Region on their Water Balance



Next Steps

- Through 2012, continue to refine our data capture of Non-Revenue water sources.
- Develop procedures to step up investigation and enforcement of Unauthorized Use
- Presentation to Council in January on the Infrastructure Leakage Index
- Report back in Q4 2012 on our Water Balance