

# Citizen Advisory Group (CAG) Meeting No 1

## Water Distribution Level of Service & Reinvestment Project

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June 21, 2013



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## Meeting Agenda

- CAG Responsibilities (Overview)
- Background
  - Project Goals
  - Water Distribution System Asset Management
  - Description of Water Distribution System
  - Project Team and Input from CAG
- Service Levels and Key Performance Indicators
- Project Overview
- Water Main Reinvestment
- CAG Responsibilities (Specific)
- Discussion/Questions



## CAG Responsibilities

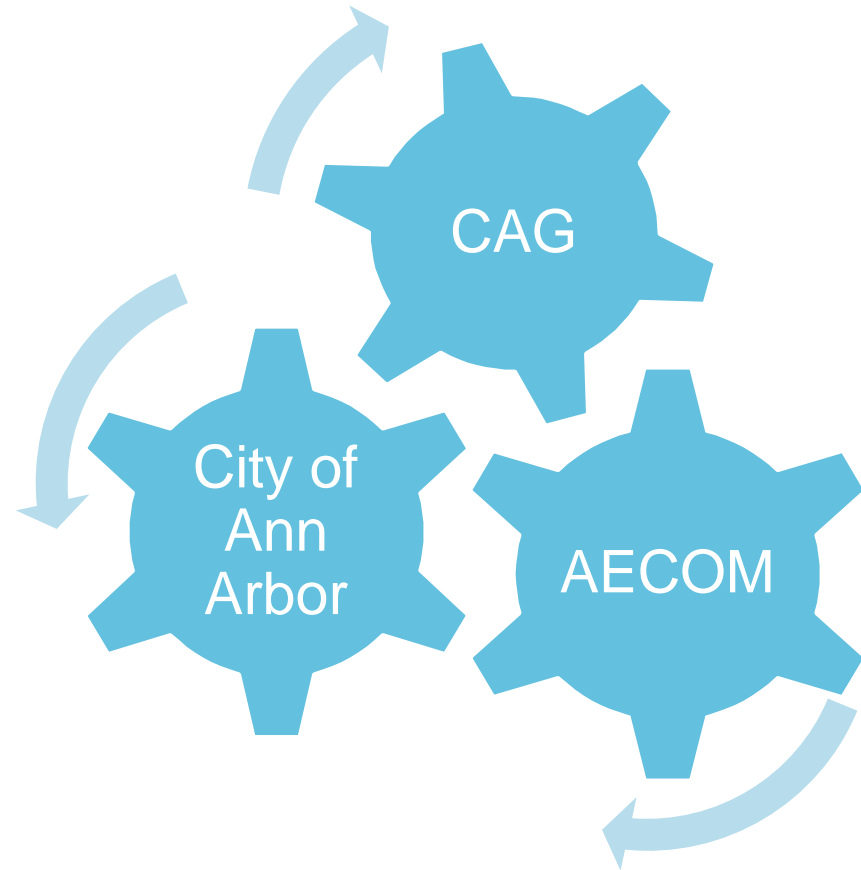
- CAG No. 1 Friday June 21<sup>st</sup> from 10:30 am – noon
  - Present project objectives, provide CAG draft copies of TM 1 & 2, provide a summary of the TMs, and answer initial questions.
- CAG No. 2a Wednesday July 17<sup>th</sup> from 1:30 – 3:00 PM
  - Provide project update, answer specific questions
- CAG No. 2b Thursday August 29<sup>th</sup> 1:30 – 3:00 PM
  - Provide draft copy of TM 3, present annual reinvestment and prioritization, and answer questions.
- CAG No. 3 Thursday October 3<sup>rd</sup> 1:30 – 3:00 PM
  - Answer specific questions on TM 3.



# Project Team and Input from CAG

## ROLE OF THE CITIZEN ADVISORY GROUP (CAG)

- CAG Purpose
  - Provide input on what is important to the public with respects of the City's water distribution system.
- City Staff Team involved through LOS workshops
  - Finance, Field and Plant Operations, Systems Planning, and GIS



# Background

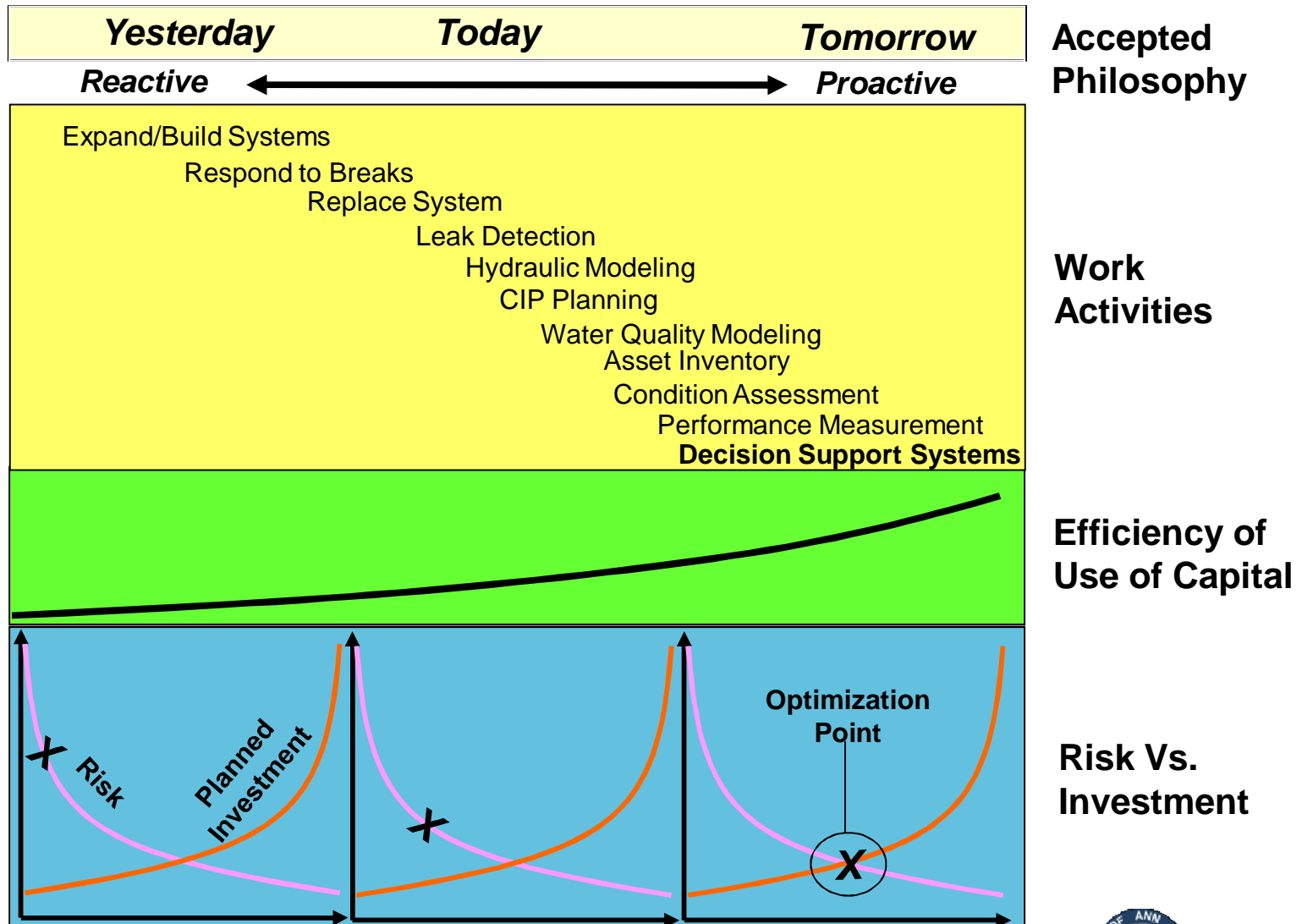
# Project Goals



- **LOS Capital Planning**
  - Service Levels help identify critical infrastructure and establish priority/timing for replacement of assets
- **Funds Spent Wisely**
  - Prioritizes limited funds to focus on assets with greatest need
- **Reduces Risk of Unexpected Costs**
  - Reduces probability of sudden and potentially costly water main failures
- **Public Benefits**
  - Efficient use of capital funds
  - Maintain Level of Service

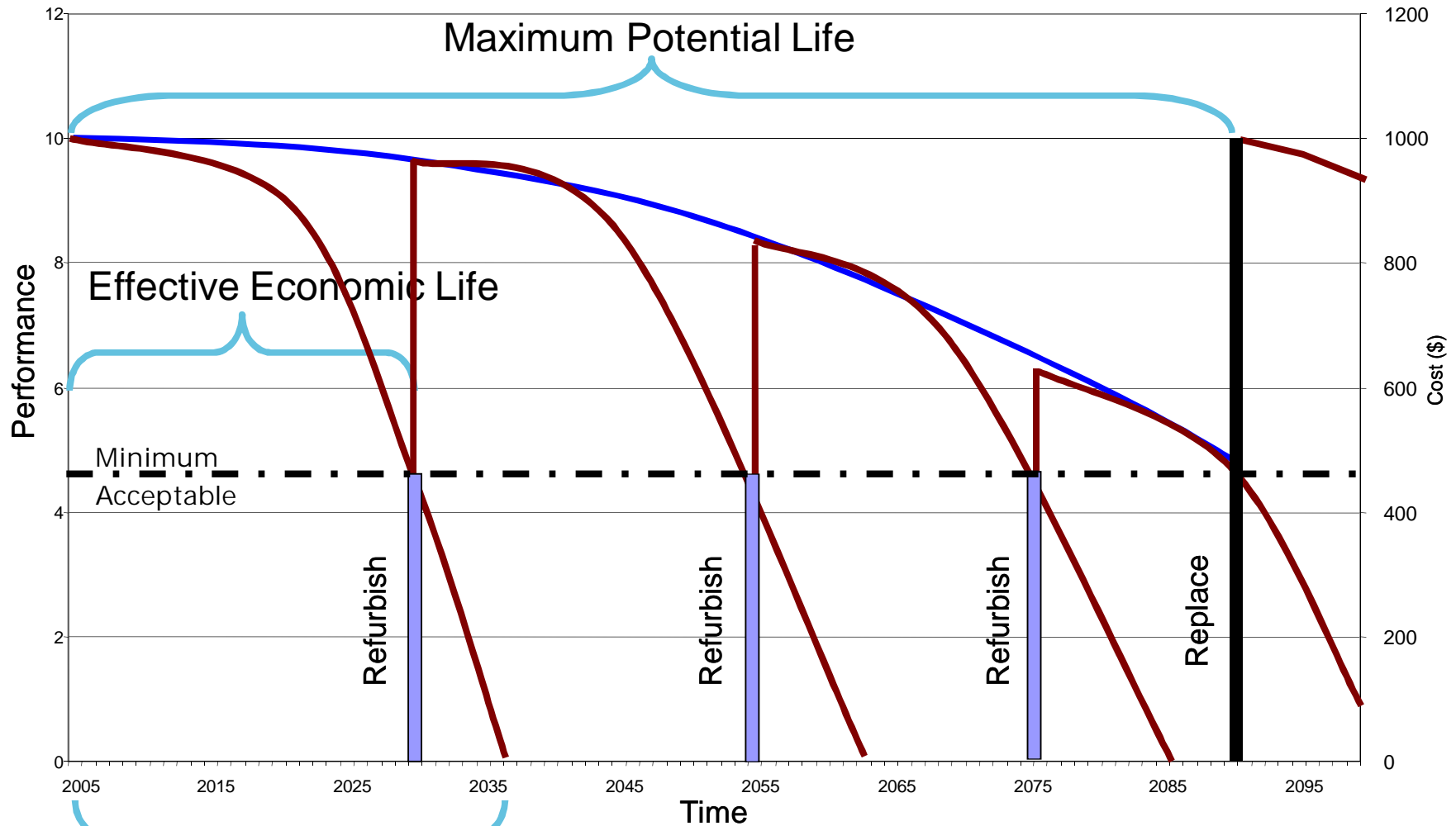


# Water Distribution System Asset Management TRENDS



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# Water Distribution System Asset Management LIFE CYCLE COST



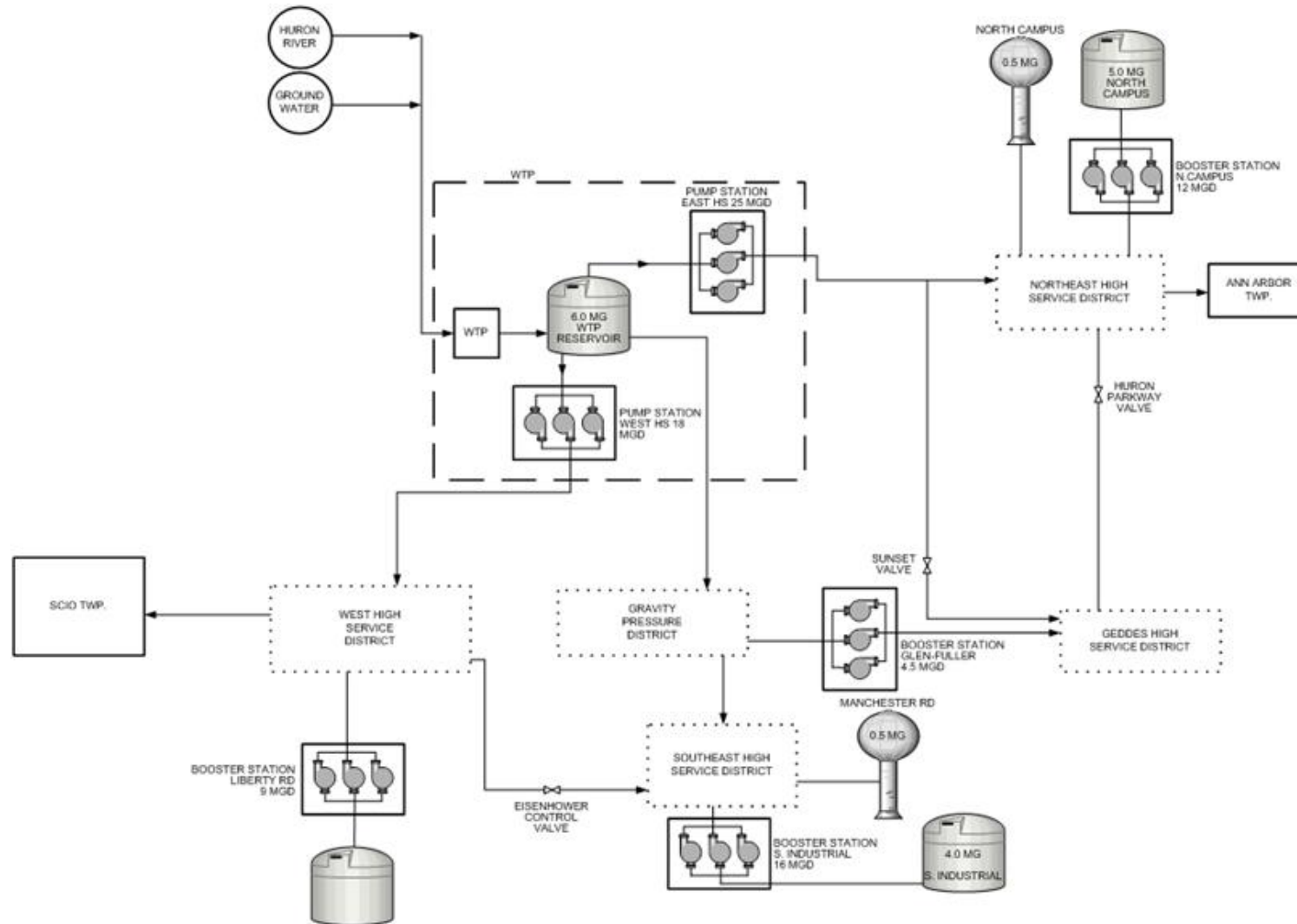
Effective Physical Life





# Description of Water Distribution System

## DISTRIBUTION SCHEMATIC



## Description of Water Distribution System CHARACTERIZATION

- Water Source: 85% Huron River, 15% Groundwater
- Water Treatment: Softening, Ozonation, Chloramination
- 3 major customers: Ann Arbor Township, Scio Township, and the University of Michigan
- 27,312 service connections
- 7,800 valves and 4,700 hydrants
- Average Day Demand is 14 million gallons per day (MGD)
- City maintains approximately 480 miles of pipe



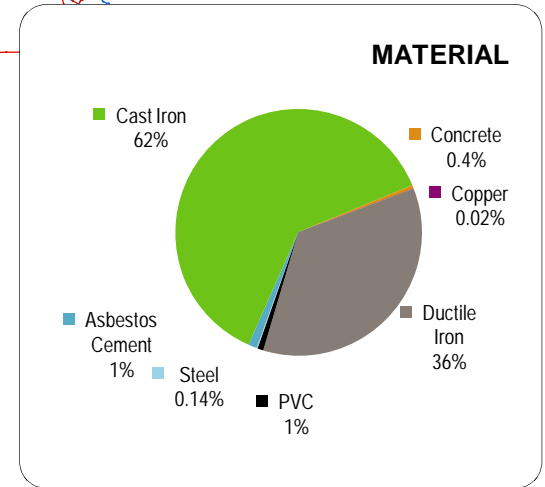
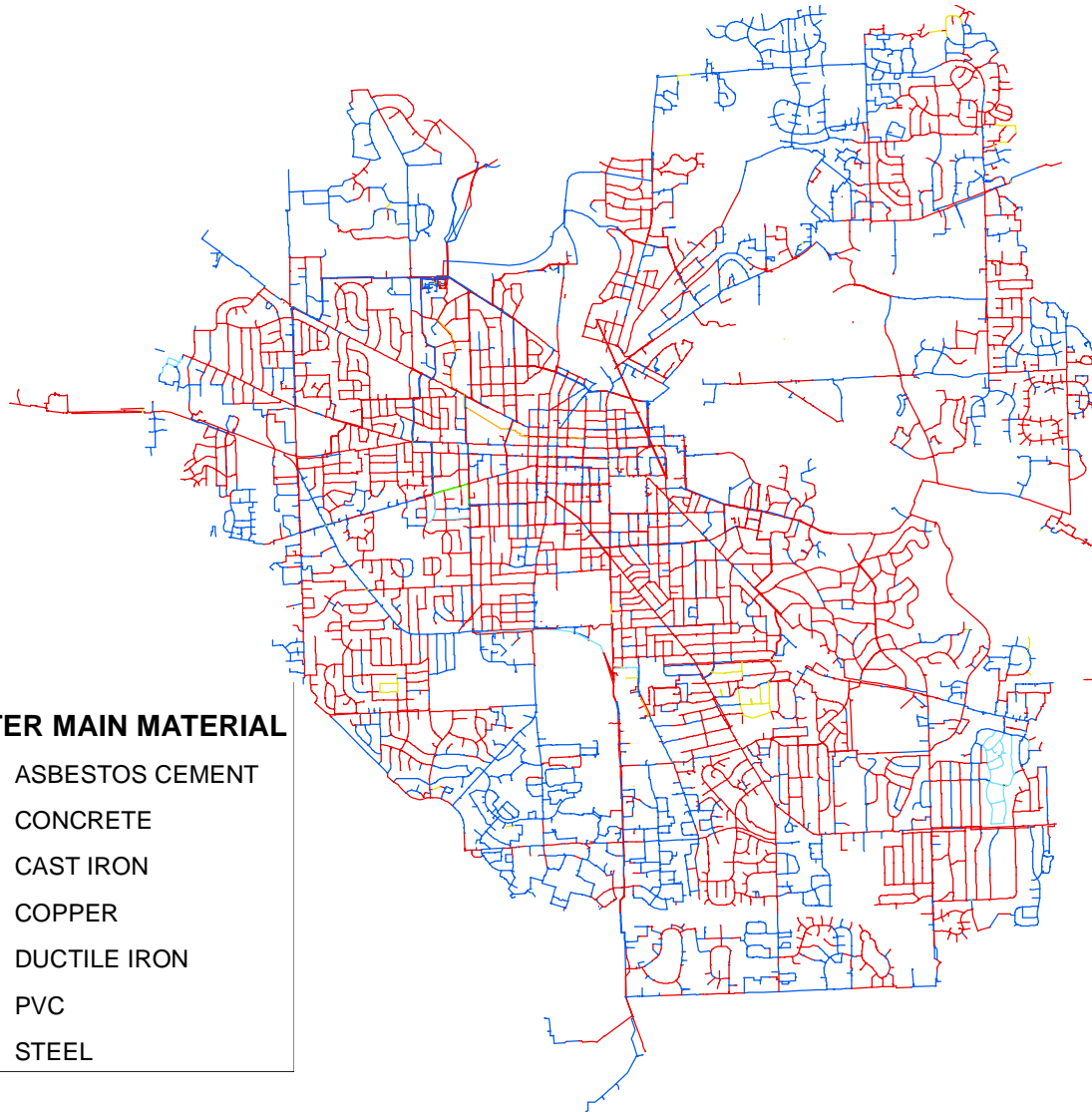
# Description of Water Distribution System

## WATER MAIN MATERIAL

Material	Approximate Total Length	Percentage of Total
Asbestos Cement	26,320 feet	1.08%
Cast Iron	1,507,930 feet	62.14%
Concrete	9,770 feet	0.40%
Copper	590 feet	0.02%
Ductile Iron	860,560 feet	35.46%
PVC	17,900 feet	0.74%
Steel	3,510 feet	0.14%
<b>Total</b>	<b>2,426,580 feet</b>	<b>100%</b>

### WATER MAIN MATERIAL

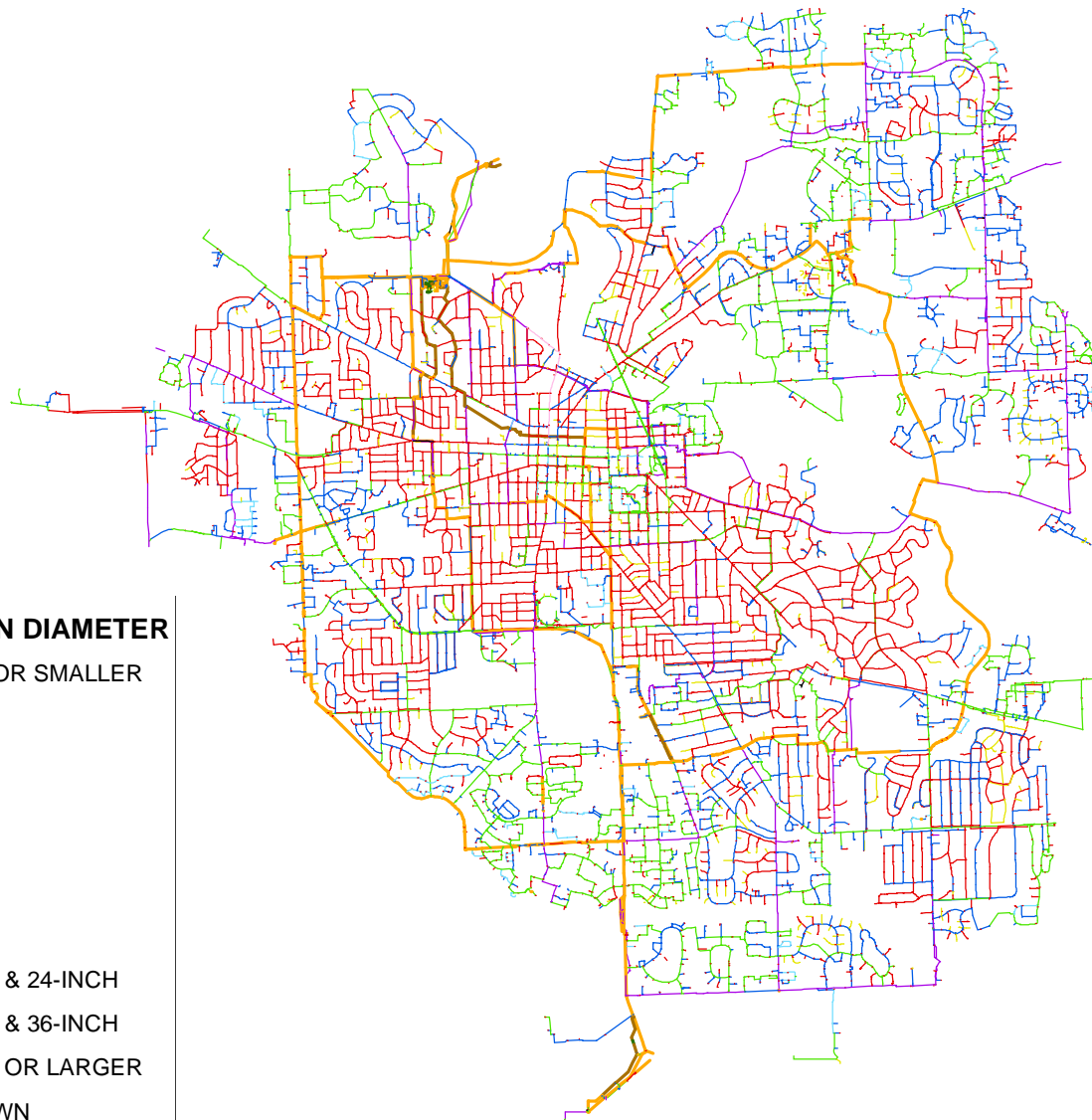
- ASBESTOS CEMENT
- CONCRETE
- CAST IRON
- COPPER
- DUCTILE IRON
- PVC
- STEEL



# Description of Water Distribution System

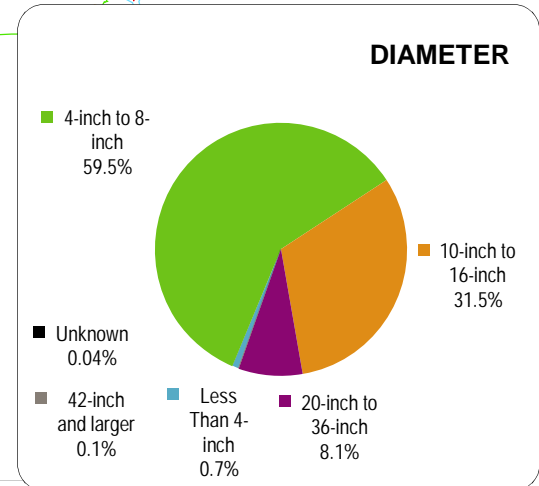
## WATER MAIN DIAMETER

Diameter	Approximate Total Length	Percentage of Total
Less Than 4-inch	18,080 feet	0.75%
4-inch	68,330 feet	2.82%
6-inch	810,600 feet	33.41%
8-inch	563,930 feet	23.24%
10-inch	56,230 feet	2.32%
12-inch	487,870 feet	20.11%
14-inch & 16-inch	220,800 feet	9.10%
20-inch & 24-inch	174,560 feet	7.19%
30-inch & 36-inch	22,350 feet	0.92%
42-inch and larger	2,920 feet	0.12%
Unknown	910 feet	0.04%
<b>Total</b>	<b>2,426,580 feet</b>	<b>100%</b>



### WATER MAIN DIAMETER

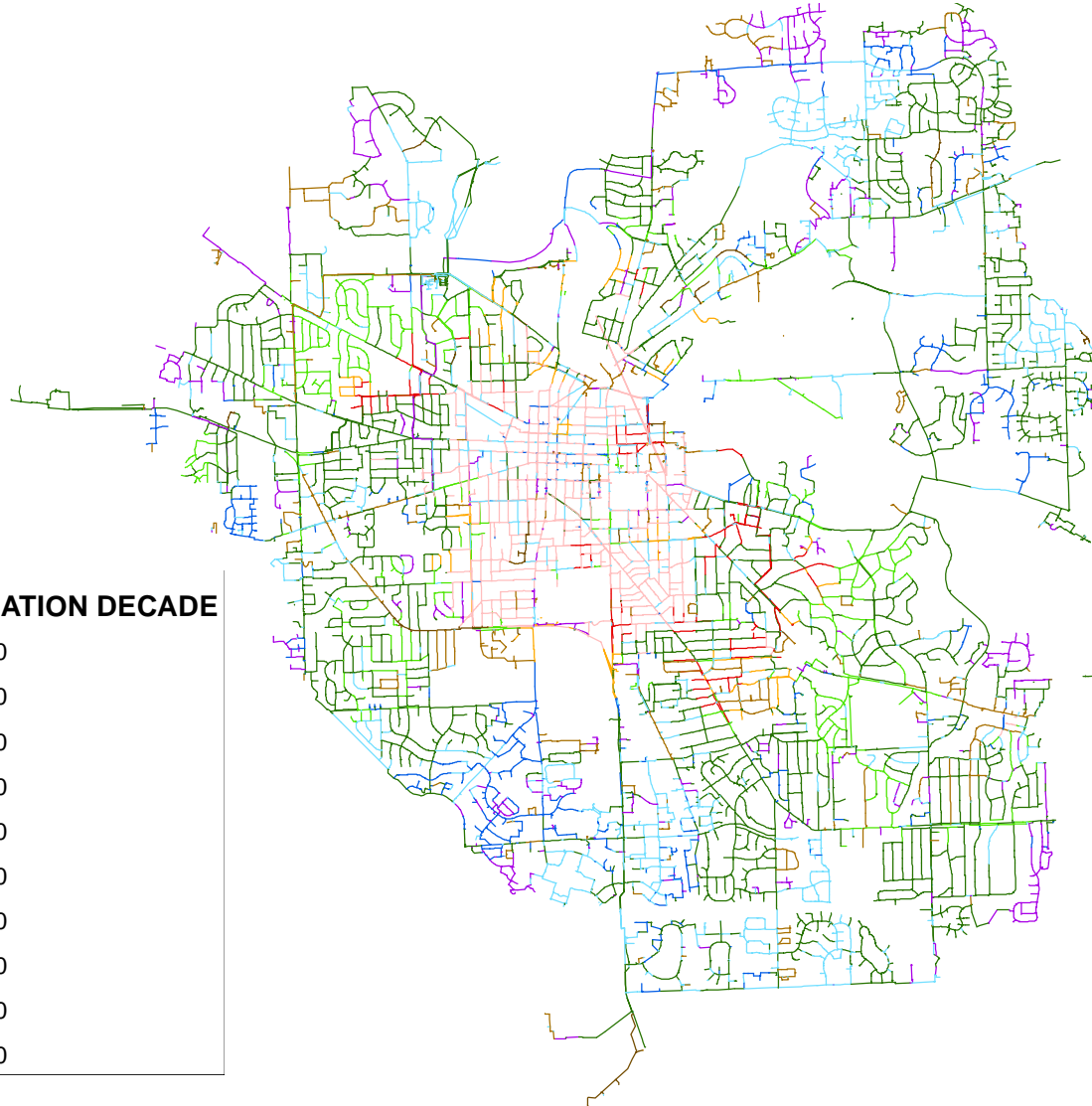
- 4-INCH OR SMALLER
- 6-INCH
- 8-INCH
- 10-INCH
- 12-INCH
- 14-INCH
- 16-INCH
- 20-INCH & 24-INCH
- 30-INCH & 36-INCH
- 42-INCH OR LARGER
- UNKNOWN



# Description of Water Distribution System

## WATER MAIN INSTALLATION DATES

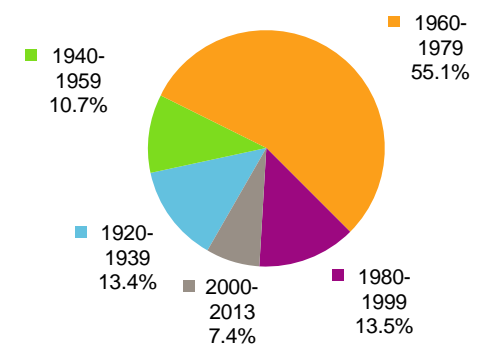
Installation Decade	Approximate Total Length	Percentage of Total
1920	260,060 feet	10.72%
1930	64,190 feet	3%
1940	57,130 feet	2%
1950	202,070 feet	8%
1960	954,070 feet	39%
1970	382,410 feet	16%
1980	152,180 feet	6%
1990	174,960 feet	7%
2000	157,340 feet	6%
2010	22,170 feet	1%
<b>Total</b>	<b>2,426,580 feet</b>	<b>100%</b>



### INSTALLATION DECADE

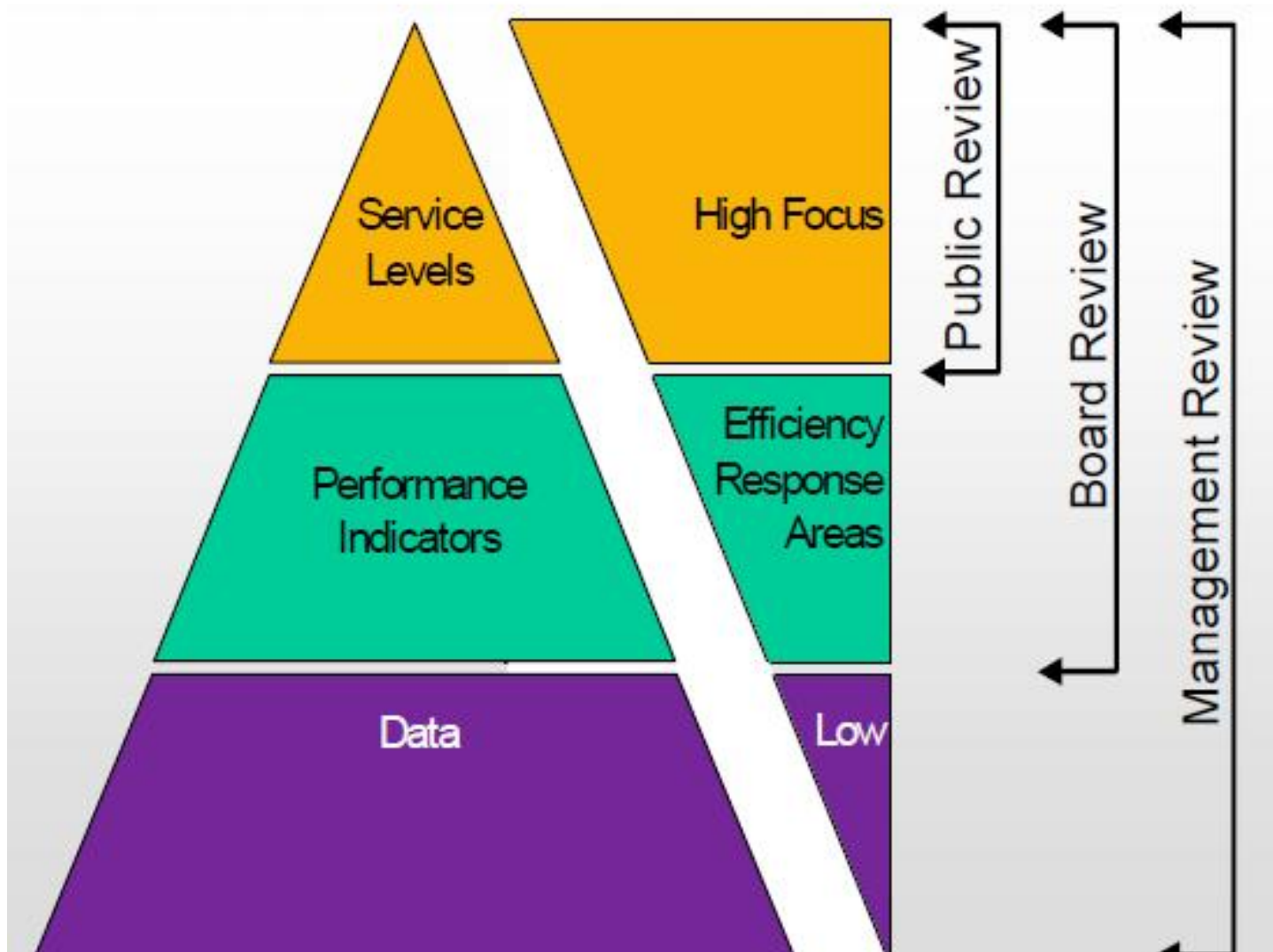
- 1920
- 1930
- 1940
- 1950
- 1960
- 1970
- 1980
- 1990
- 2000
- 2010

### INSTALLATION DATE



# Service Levels and Key Performance Indicators

# Service Levels – How does the CAG fit in?



Source: **SETTING CUSTOMER SERVICE LEVELS** A series of papers by: Kevin Young, Hunter Water, Australia



# WHAT are Service Levels?

## EXAMPLES OF SERVICE LEVEL

- Clean, safe drinking water to meet current regulatory guidelines.
- Water Outages
  - Planned
  - Unplanned
- System Pressure above 35 psi
- Response to Customers Queries
- Leakage Level





## What is a Performance Indicator?

- Ways to define, measure and track service levels.
- Key Performance Indicators (KPI) were selected using the following guidelines:
  - KPI that help measure performance against defined Service Level
  - Current availability of data should not drive KPI selection.
  - Selecting KPI with an outward, public focus.
  - KPI should be understandable by the public.



# Selected Service Levels

Service & Infrastructure	Operational	Quality of Service/Public Health	Financial/Economic Efficiency
<ul style="list-style-type: none"> <li>✓ Number of Water Main Breaks</li> <li>✓ <b><u>Unplanned Service Interruptions/Disruptions</u></b></li> <li>✓ <b><u>Planned Service Interruptions/Disruptions</u></b></li> <li>✓ <b><u>Age of Meters</u></b></li> <li>✓ <b><u>6-year Capital Reinvestment Percent</u></b></li> <li>✓ <b><u>Hydrant Availability</u></b></li> <li>✓ <b><u>Main Rehabilitation/Replacement</u></b></li> </ul>	<ul style="list-style-type: none"> <li>✓ Infrastructure Leakage Index (ILI)</li> <li>✓ Per Capita Average Daily Consumption</li> </ul>	<ul style="list-style-type: none"> <li>✓ <b><u>Water Quality Compliance Rate</u></b></li> <li>✓ <b><u>Reporting Violations</u></b></li> <li>✓ <b><u>Calls for Service Resolved within LOS</u></b></li> <li>✓ <b><u>Customer Service Complaints</u></b></li> <li>✓ <b><u>Water Quality Complaints</u></b></li> <li>✓ <b><u>Water Taste Complaints</u></b></li> <li>✓ <b><u>Water Odor Complaints</u></b></li> <li>✓ <b><u>Water Color Complaints</u></b></li> <li>✓ <b><u>Water Pressure Complaints</u></b></li> </ul>	<ul style="list-style-type: none"> <li>✓ <b><u>Water Rate for Typical Residential Customer</u></b></li> <li>✓ O&amp;M FTEs</li> <li>✓ Annual O&amp;M Costs</li> <li>✓ Percent of Maintenance Unplanned</li> <li>✓ Preventative Maintenance Ratio</li> <li>✓ <b><u>Bond Rating</u></b></li> <li>✓ Debt Coverage Ratio</li> </ul>

Key Performance Indicators (KPI) denoted as the performance indicators that are **bold underlined**.



# Service Levels and KPIs

Organizational Goal	Performance Related Notes	Specific LOS KPI	Specific LOS KPI Target
Provide Reliable and Responsive Water Service	<ul style="list-style-type: none"> <li>✓ General expectation is that drinking water is available to customers all of the time (24/7).</li> <li>✓ Unplanned interruptions to water supply do occasionally happen and the City must respond rapidly.</li> <li>✓ Planned service interruptions are reasonable but advance notice to customers is required.</li> <li>✓ Fire flow to hydrants required all of the time.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Unplanned Service Interruptions/Disruptions</li> <li>✓ Planned Service Interruptions/Disruptions</li> <li>✓ Age of Meters</li> <li>✓ 6-year Capital Reinvestment Percent</li> <li>✓ Hydrant Availability</li> <li>✓ Main Rehabilitation/Replacement</li> </ul>	<ul style="list-style-type: none"> <li>✓ AWWA median (Midwest): &lt; 4 hrs [2.00], 4-12 hrs [0.80], and &gt;12 hrs [0.03]. Units customer per 1,000 customers</li> <li>✓ AWWA median (Midwest): &lt; 4 hrs [4.9], 4-12 hrs [0.80], and &gt;12 hrs [0.17]. Units customers per 1,000 customers</li> <li>✓ Residential Meters: Replace every 10 years but prioritize based upon water usage and/or testing results; Larger Meters: Replace based upon regular testing.</li> <li>✓ TBD.</li> <li>✓ 100%</li> <li>✓ TBD during TM 3.</li> </ul>
Provide Adequate Capacity	<ul style="list-style-type: none"> <li>✓ Water must be provided with adequate pressure to meet household needs (eg: showers, etc.).</li> </ul>	<ul style="list-style-type: none"> <li>✓ Water Pressure Complaints</li> </ul>	<ul style="list-style-type: none"> <li>✓ 1 complaint per 1,000 accounts (~27 complaints per year)</li> </ul>
Protect Public Health and Safety	<ul style="list-style-type: none"> <li>✓ Water quality regulations govern the required standard for drinking water quality.</li> <li>✓ Provided with adequate pressure to meet regulatory requirements.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Water Quality Compliance Rate</li> <li>✓ Reporting Violations</li> </ul>	<ul style="list-style-type: none"> <li>✓ 100% compliance</li> <li>✓ 0 violations</li> </ul>



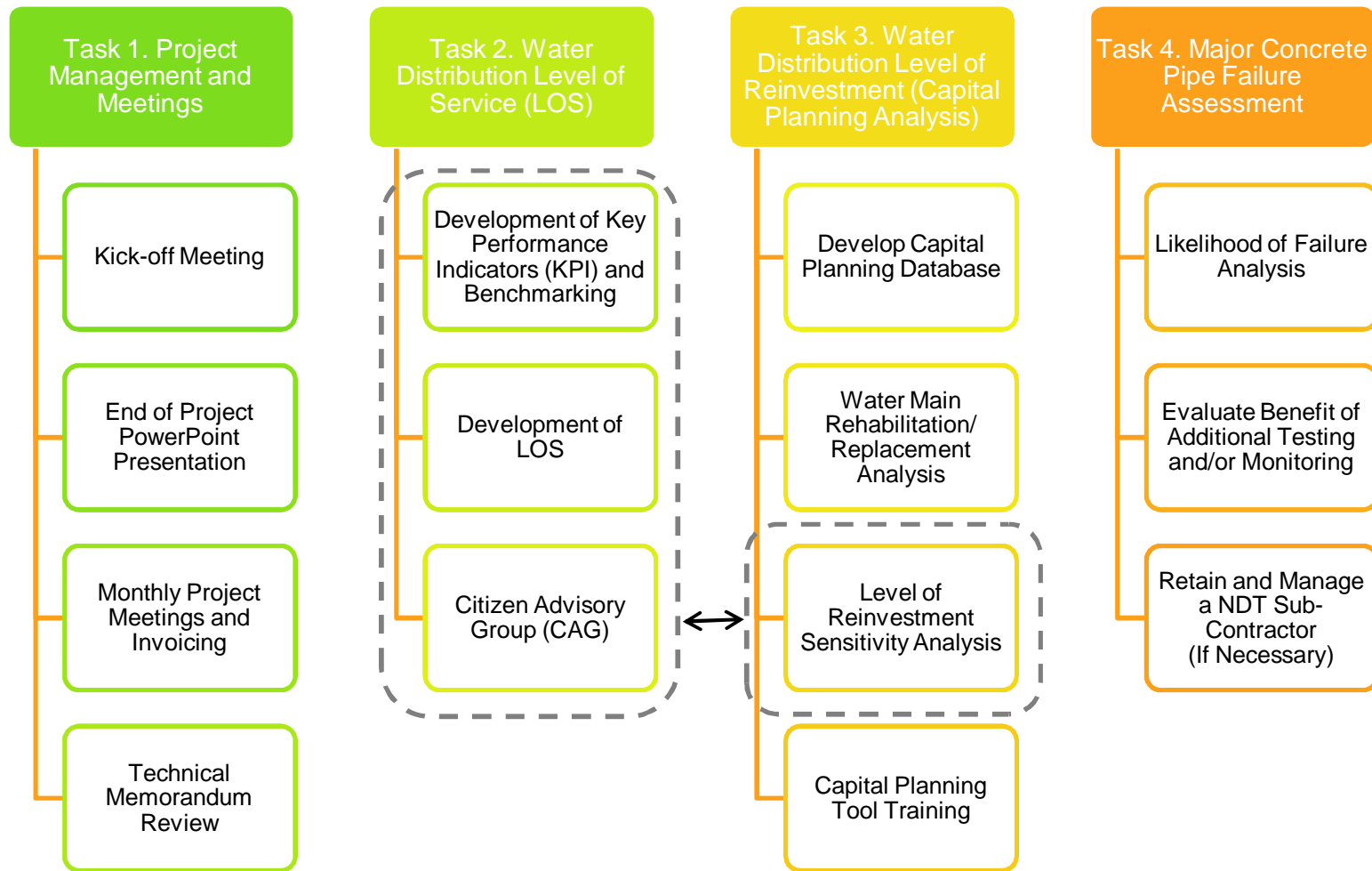
## Service Levels and KPIs cont.

<b>Protect the Environment</b>	<ul style="list-style-type: none"> <li>✓ Promoting water conservation is an organizational goal from the Sustainability Resolution.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Annual Water Consumption</li> </ul>	<ul style="list-style-type: none"> <li>✓ TBD</li> </ul>
<b>Provide Good Customer Service</b>	<ul style="list-style-type: none"> <li>✓ Provide specific call response targets.</li> <li>✓ Provide immediate emergency response to customers when water quality issues are identified.</li> <li>✓ Though not a direct health issue, customers desire that drinking water be clear, tasteless, and odorless.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Calls for Service Resolved within LOS</li> <li>✓ Customer Service Complaints</li> <li>✓ Water Quality Complaints</li> <li>✓ Water Taste Complaints</li> <li>✓ Water Odor Complaints</li> <li>✓ Water Color Complaints</li> </ul>	<ul style="list-style-type: none"> <li>✓ 1 hour for emergency response, 2 weeks for meter reading correction, 12 hour for unplanned water interruption, and instant information for water quality issues.</li> <li>✓ 5.0 (AWWA median (Midwest): 5.4). Units complaints per 1,000 accounts</li> <li>✓ 5.0 (AWWA median (Midwest): 5.4). Units complaints per 1,000 accounts</li> <li>✓ For taste, odor and color: 0.1, 1.0, and 3.0 complaint per 1,000 accounts respectively</li> </ul>
<b>Provide a Safe Workplace</b>	<ul style="list-style-type: none"> <li>✓ Number of accidents.</li> <li>✓ Number of "near misses".</li> <li>✓ Accident severity (measure by total lost time due to accidents).</li> <li>✓ Accident statistics are reported to OSHA.</li> </ul>	<ul style="list-style-type: none"> <li>✓ N/A. This is not a LOS specific to the water distribution system infrastructure assets. Performance indicators should be tracked as a management objective measure.</li> </ul>	<ul style="list-style-type: none"> <li>✓ N/A</li> </ul>
<b>Recover Full Cost of Service</b>	<ul style="list-style-type: none"> <li>✓ Customers are charged water rates to pay for water services.</li> <li>✓ Some water related costs may be covered through service fees.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Water Rate for Typical Residential Customer</li> <li>✓ Bond Rating</li> </ul>	<ul style="list-style-type: none"> <li>✓ TBD during TM 3.</li> <li>✓ S&amp;P (AA+); Moody's (Aa1)</li> </ul>



# Overview of Project

# Specific Project Tasks



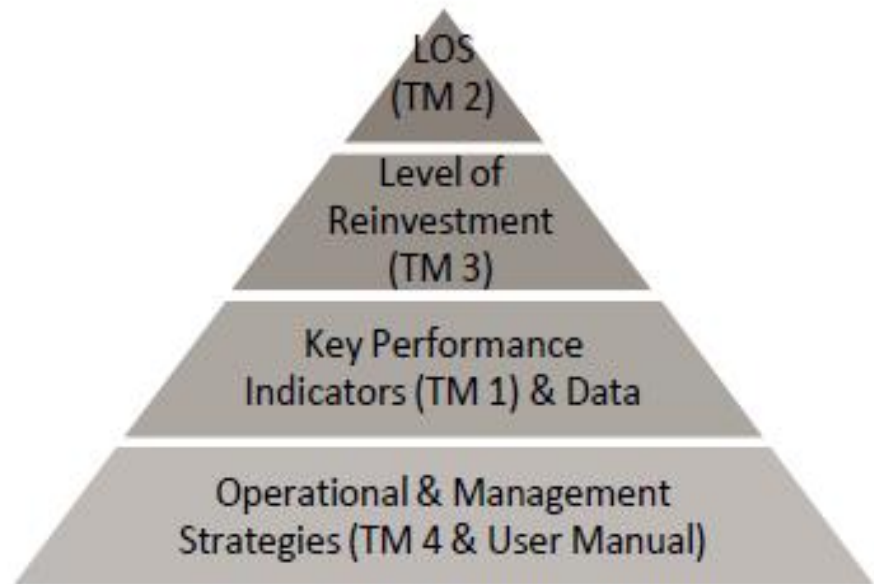
## Key Deliverables

- Establishment and definition of LOS for the water distribution system.
- Benchmarking of the City's system at a national level and to comparable cities.
- Determination of the level of reinvestment through replacement and/or rehabilitation of the system over the next 20 years.
- An assessment of the likelihood of failure of the major concrete pipes in the system.



## Relational Pyramid of LOS

- LOS does not stand alone.
  - Top level of a well organized program of infrastructure management for a specific asset.
  - Supported by underlying blocks.
- LOS summarizes the operational results that the City is striving to achieve on its customer's behalf.





Hand-out Working Copies of TM 1 & 2

# Overview of TM 1 & 2 Contents

## Overview of TM 1

- City Workshops No. 1 & 2 held to select both performance indicators and key performance indicators
- TM 1 is a reference document
  - Clearly document selection and calculation
  - Capture institutional knowledge
- Explain structure
- Purpose of benchmarking
  - Provides reference but caution against sweeping conclusions
  - Trending most useful



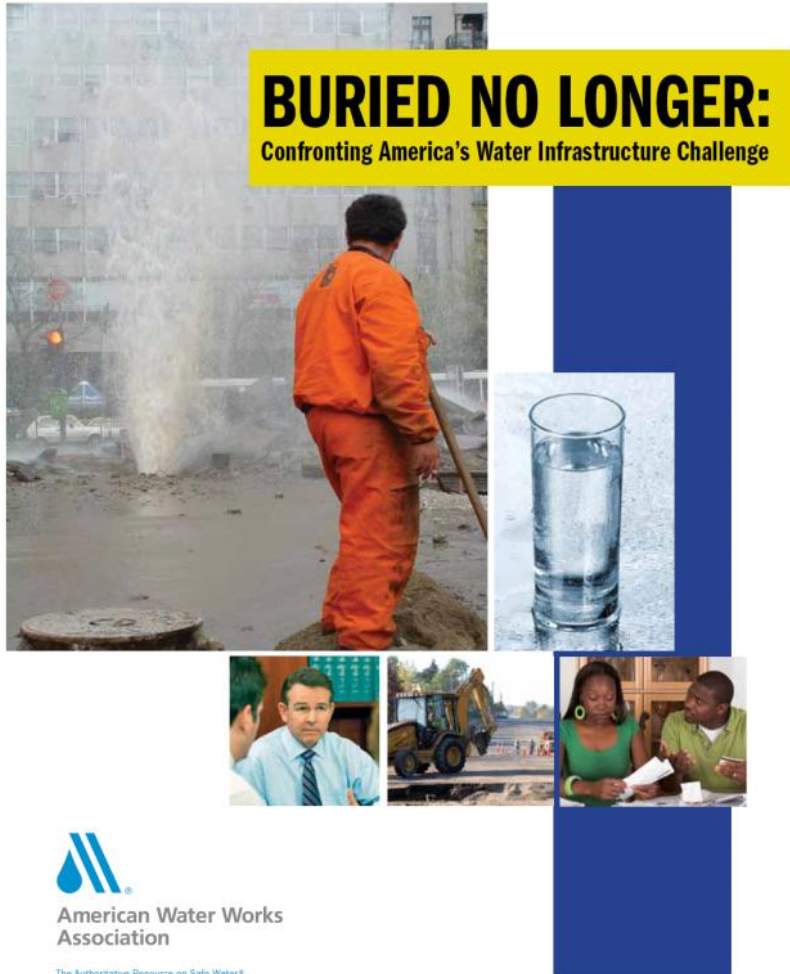
## Overview of TM 2

- Level of Service: Why is it important?
- Sustainability
  - Balance between the overall well-being of the customer and economic costs.
  - Reviewed City's existing sustainability goals.
- Framework for Considering Level of Service
  - Organize and arrange performance indicators and their relation context to existing City systems and functions.
- Defining Level of Service
  - Organizational Goals
  - Performance Related Notes
  - Specific LOS KPI and Targets



# Water Main Reinvestment

# The Need to Reinvest in the Water System



\$1 trillion over next 25 years

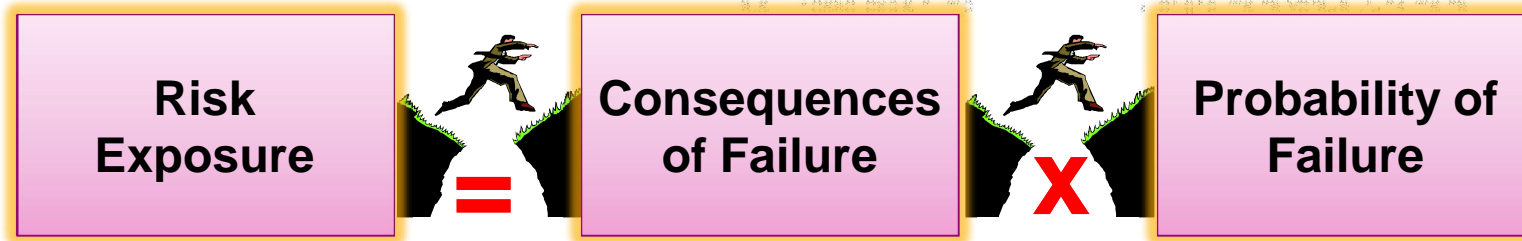
Delaying the investment can result in degrading water service

Ultimately we will need to “catch up” with Past deferred investment

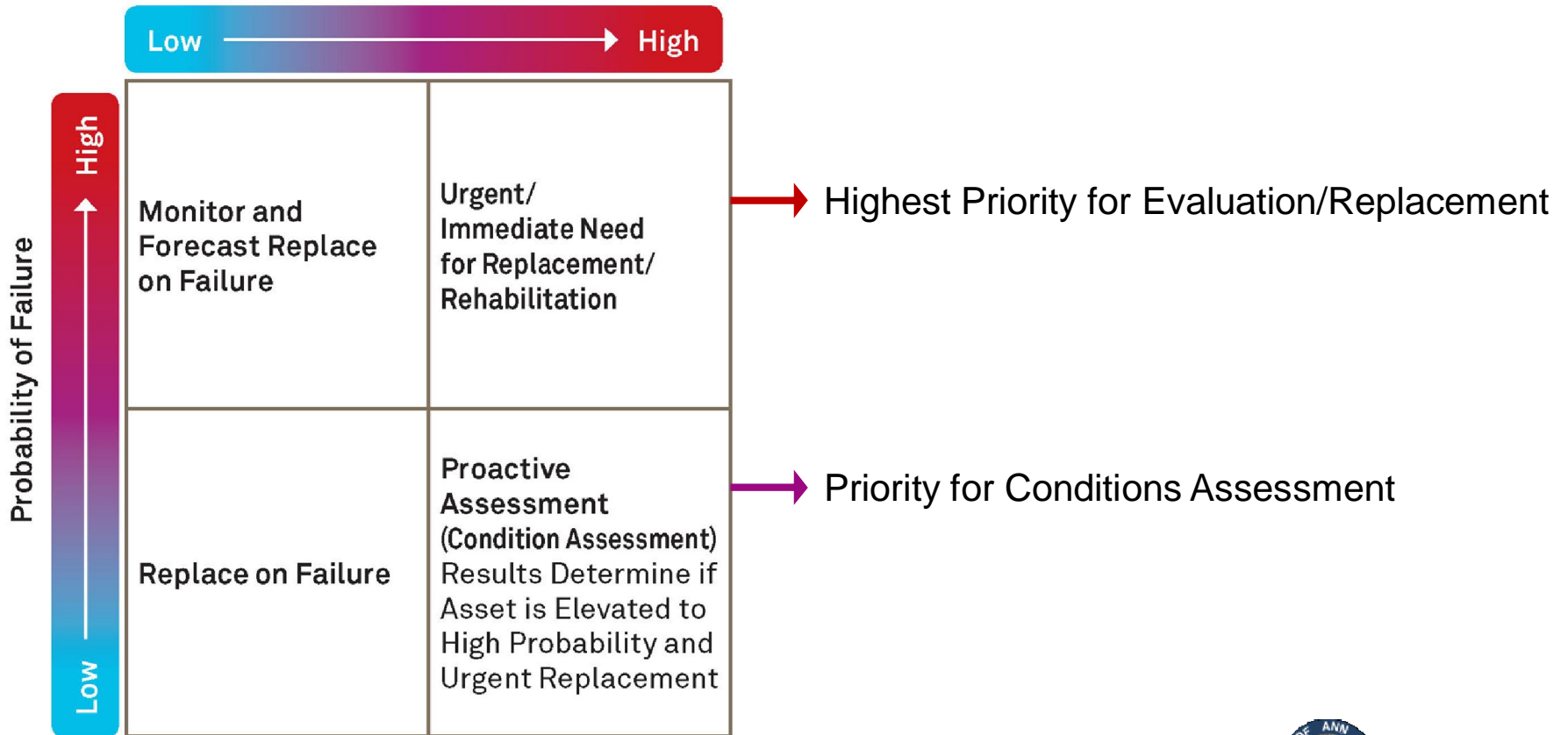


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# Risk Management Approach



Consequence of Failure



Risk Matrix



# Risk Matrix

Probability of Failure	Criticality				
	Low	→	Medium	→	High
Low	Negligible	Negligible	Low	Low	Moderate
↓	Negligible	Low	Low	Moderate	Moderate
Medium	Low	Low	Moderate	Moderate	High
High	High	High	High	High	High

Consequences

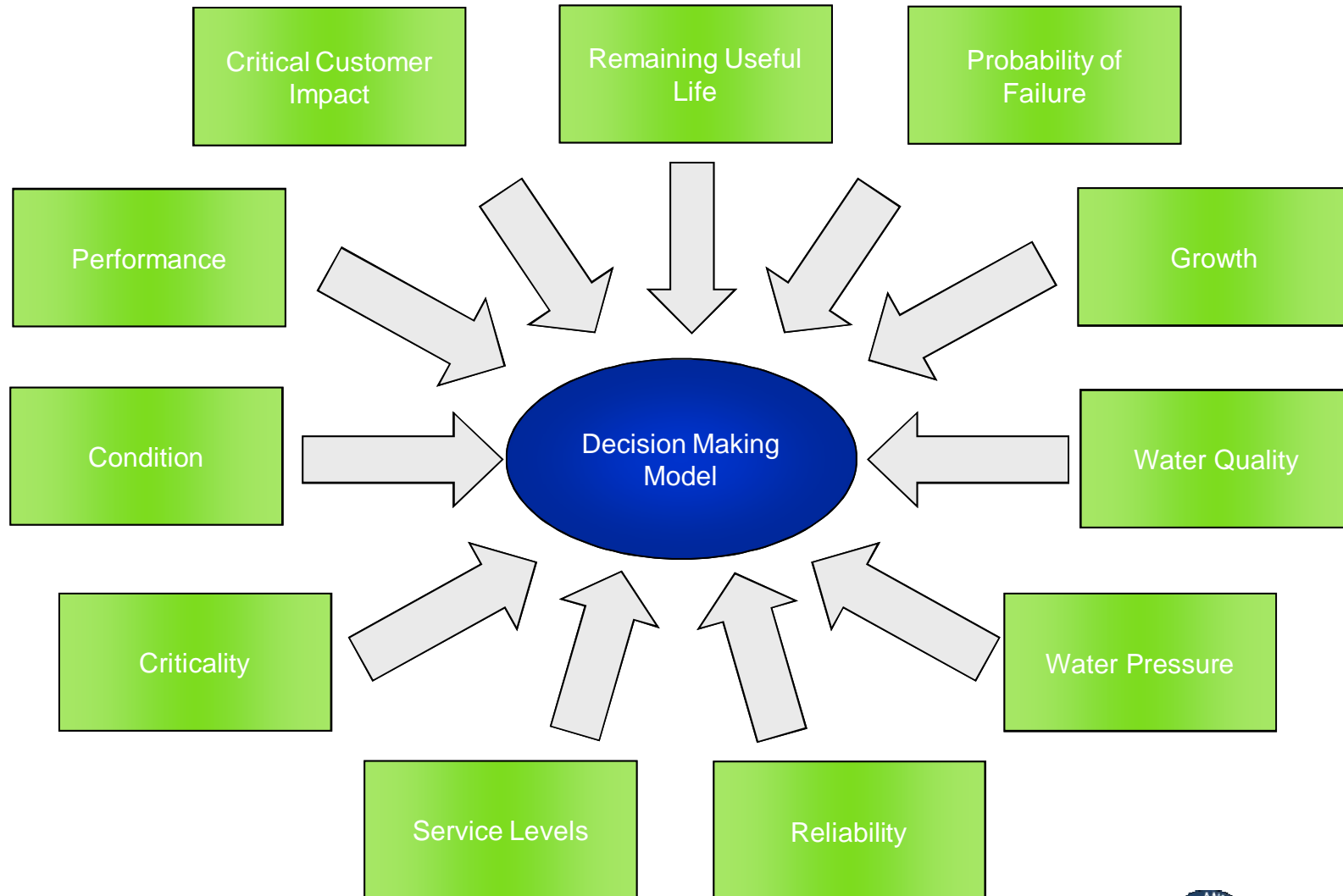
	H	M	L
H	Urgent Rehabilitate / Replace	Programmed Rehabilitate / Replace	Repair/ Replace on Failure
M	Programmed Rehabilitate / Replace	Proactive Assessment	Monitor and Forecast
L	Proactive Assessment	Monitor and Forecast	Monitor and Forecast

DECISION MATRIX: City of Winnipeg Water Main Criticality Assessment Study





# Prioritization Criteria - Example



# Action Items

## Action Items

- CAG
  - Read TM 1 & 2
  - Bring questions/comments to next meeting
- Work Progress
  - Development of capital planning model
  - Generating initial prioritization results
- CAG No. 2a Wednesday July 17<sup>th</sup> from 1:30 – 3:00 PM
  - Provide project update, answer specific questions and receive comments on TM 1 & 2.



## Project Team Interaction

# SCHEDULE OF MEETINGS

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# Discussion/Questions

# Thank You

This document is based on information reasonably available to AECOM. It includes estimates and calculations of future events that involve or may be subject to unknown or unpredictable variables, or information that may otherwise naturally vary depending on time, place and other circumstances. As AECOM does not control such information or variables that may affect our services, it cannot provide any warranty or guaranty that future results will indeed meet current estimates.



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