

Cityworks[®]

Empowering GIS for Public Asset Management™

Extending The GIS Platform Water / Waste Water Asset Management

***The Authoritative Platform For Emerging Infrastructure
Management Standards***

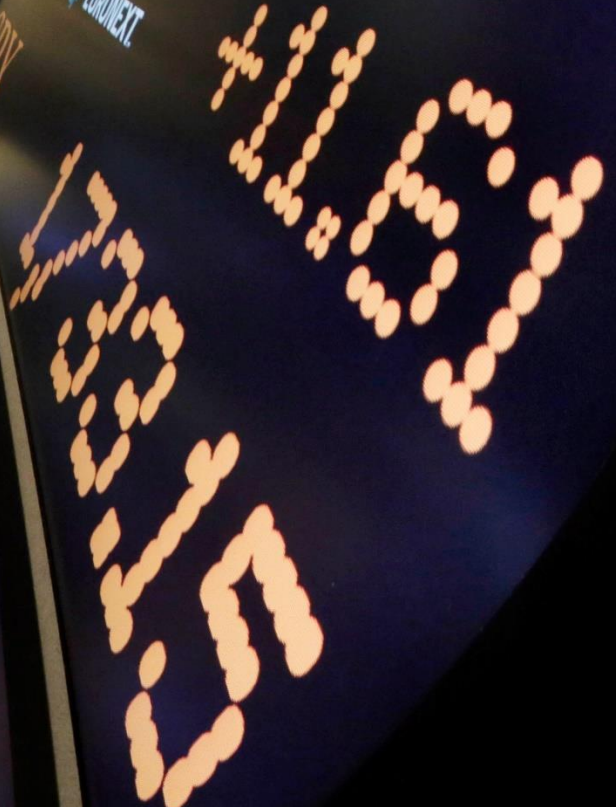




1,715.

1,709.7

NYSE
EQUINOX



5/15
1728 +14.80

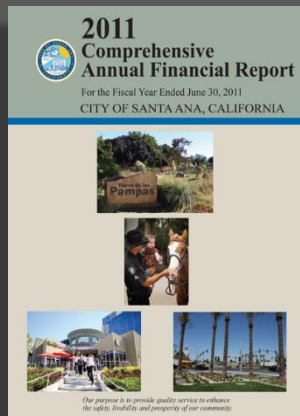
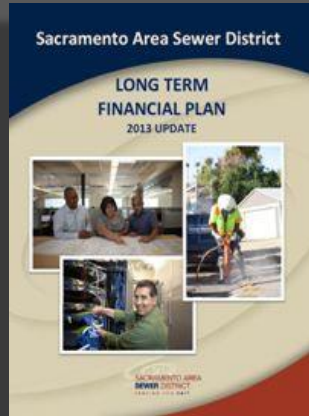
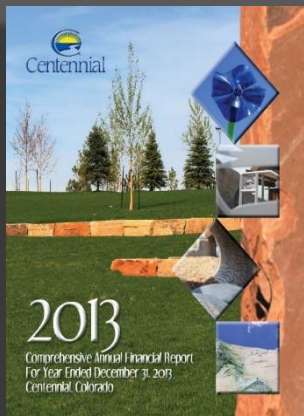
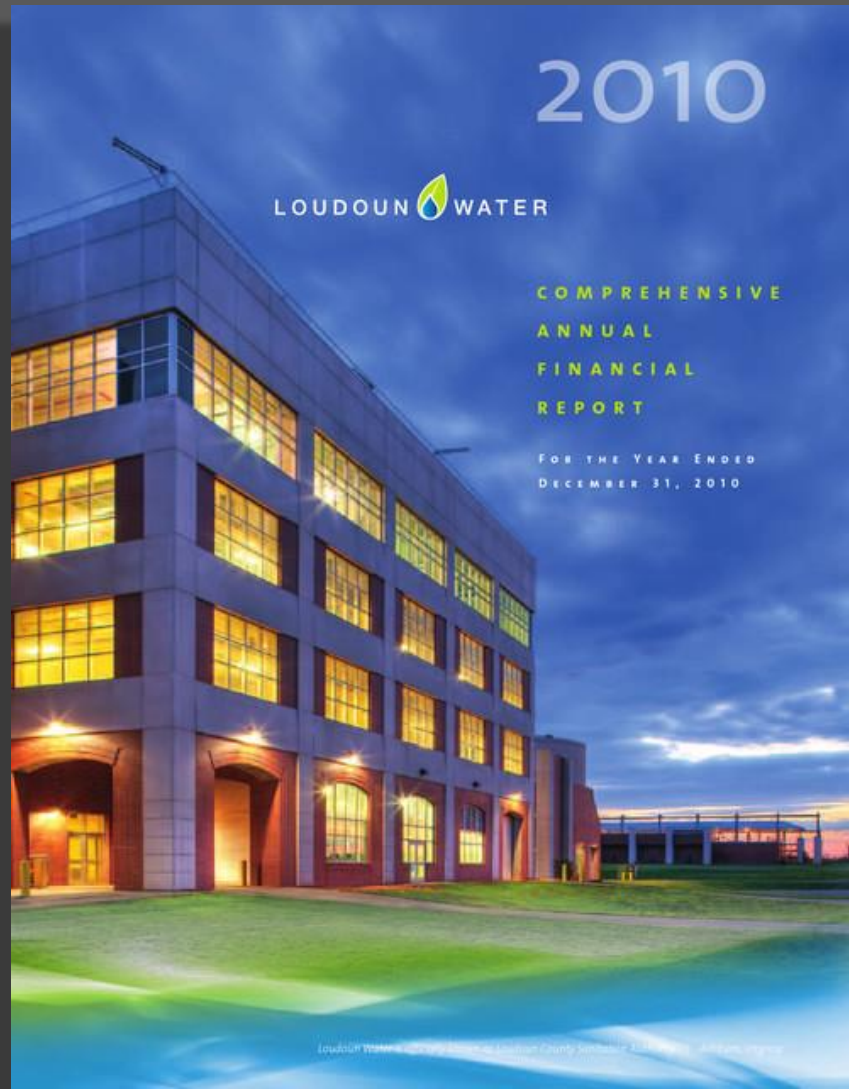
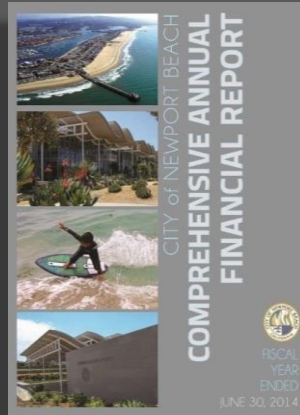
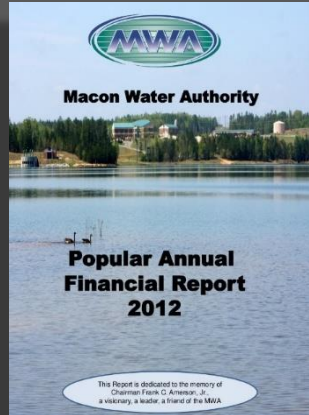
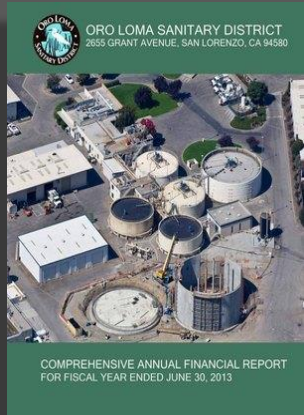
2587
12987
25995
25996
25997
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25999
26000

-0.80
+0.80
+5.00

CRYAN

STRECHER

NOVIGOLD
FAB





CITY OF PORTLAND
2014 Stormwater Management Manual

PORTLAND PLAN

Infrastructure
Condition and Capacity



PORTLAND PLAN BACKGROUND REPORT
FALL 2009



City of Portland Bureau of
Planning and Sustainability
Sam Adams, Mayor | Susan Anderson, Director



Drinking Water Infrastructure Needs Survey and Assessment

Fifth Report to Congress



Year	1995	1999	2003	2007	2011
National Need	\$227.3	\$224.8	\$375.9	\$379.7	\$384.2

Exhibit 1.1: Total National 20-Year Need (in billions of January 2011 dollars)

System Size and Type	Need
Large Community Water Systems* (serving over 100,000 persons)	\$145.1
Medium Community Water Systems* (serving 3,301-100,000 persons)	\$161.8
Small Community Water Systems (serving 3,300 and fewer persons)†	\$64.5
Not-for-Profit Noncommunity Water Systems‡	\$4.6
Total State Need	\$376.0
Alaska Native Village Water Systems	\$0.6
American Indian Water Systems	\$2.7
Costs Associated with Proposed and Recently Promulgated Regulations	\$4.9
Total National Need	\$384.2

Wastewater \$298B

Infrastructure in the United States Shows Slow Improvement

American Society of Civil Engineers 2013 Infrastructure Report Card

Infrastructure Sector	Grade	Trend*	
Aviation	D	—	
Bridges	C+	↑	
Dams	D	—	
Drinking Water	D	↑	A = Exceptional
Energy	D+	—	B = Good
Hazardous Waste	D	—	C = Mediocre
Inland Waterways	D-	—	D = Poor
Levees	D-	—	F = Failing
Ports	C	N/A**	
Public Parks and Recreation	C-	—	
Rail	C+	↑	
Roads	D	↑	
Schools	D	—	
Solid Waste	B-	↑	
Transit	D	—	
Wastewater	D	↑	

Source: American Society of Civil Engineers, 2013.
 *Compared to 2009 Infrastructure Report Card.
 **New category in 2013.



FAILURE TO ACT
THE ECONOMIC IMPACT
OF CURRENT INVESTMENT TRENDS IN
WATER AND WASTEWATER TREATMENT
INFRASTRUCTURE ★★★★★

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS



Dawn of the Replacement Era

Reinvesting in
Drinking Water
Infrastructure

An
Analysis
of Twenty
Utilities'
Needs for
Repair and
Replacement
of Drinking Water
Infrastructure

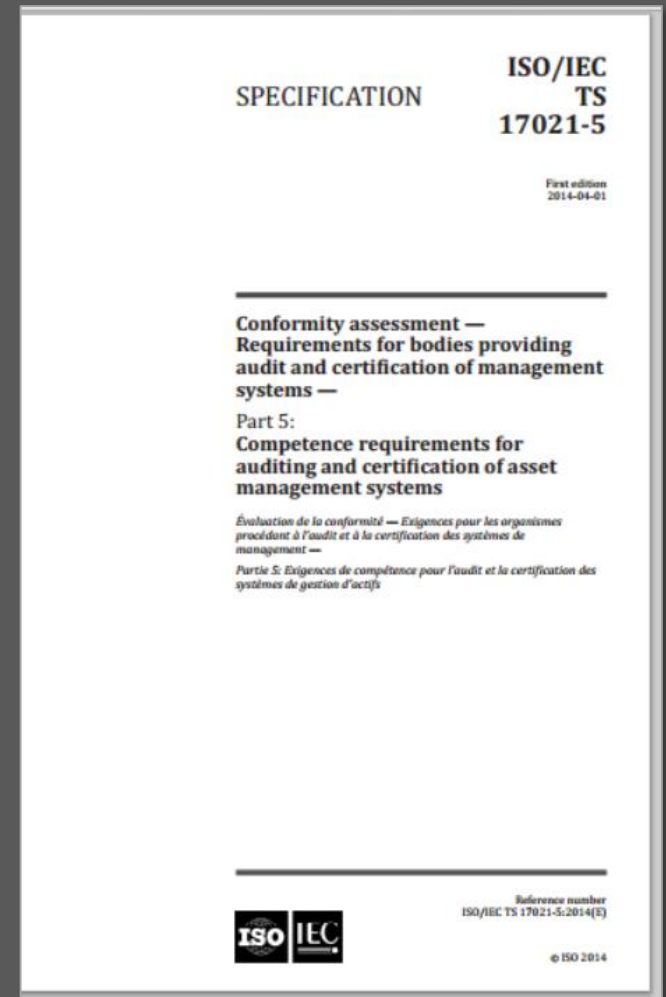


A Study Sponsored by
The AWWA Water Industry
Technical Action Fund

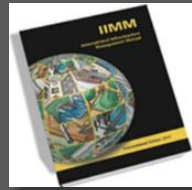
May 2001

Headquarters Office
6666 W. Quincy Ave., Denver, CO 80235
(303) 794-7711 Fax: (303) 794-1440
<http://www.awwa.org>

Government Affairs Office
1401 New York Ave., NW, Suite 640,
Washington, DC 20005
(202) 628-8303 Fax (202) 628-2846



STANDARD



The process of acquisition, use and disposal of assets to gain the most value while managing risk and cost over their entire life.

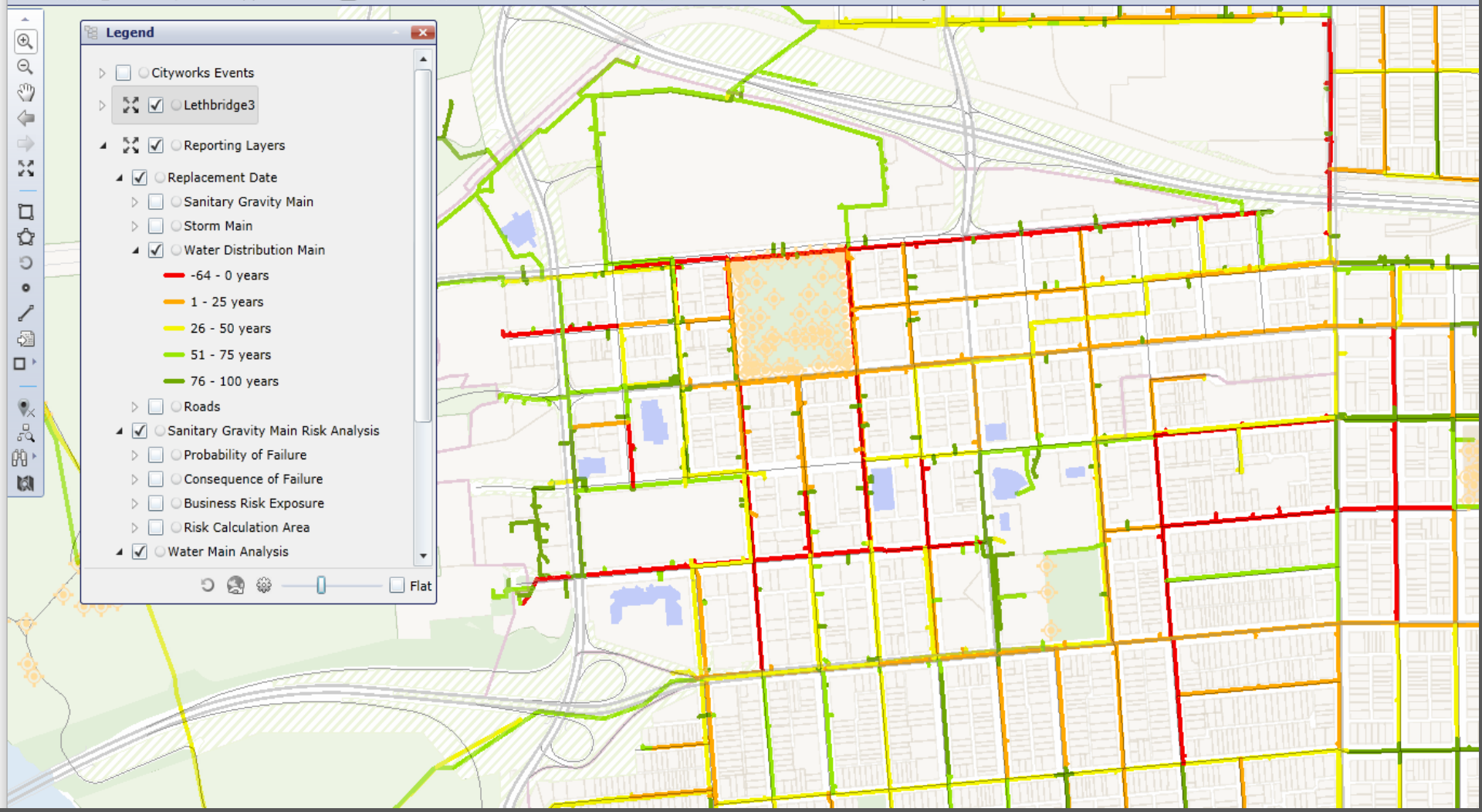


DEFINITION

Legend

- Cityworks Events
- Lethbridge3
- Reporting Layers
 - Replacement Date
 - Sanitary Gravity Main
 - Storm Main
 - Water Distribution Main
 - 64 - 0 years
 - 1 - 25 years
 - 26 - 50 years
 - 51 - 75 years
 - 76 - 100 years
 - Roads
 - Sanitary Gravity Main Risk Analysis
 - Probability of Failure
 - Consequence of Failure
 - Business Risk Exposure
 - Risk Calculation Area
 - Water Main Analysis

Flat



ASSET LIFE

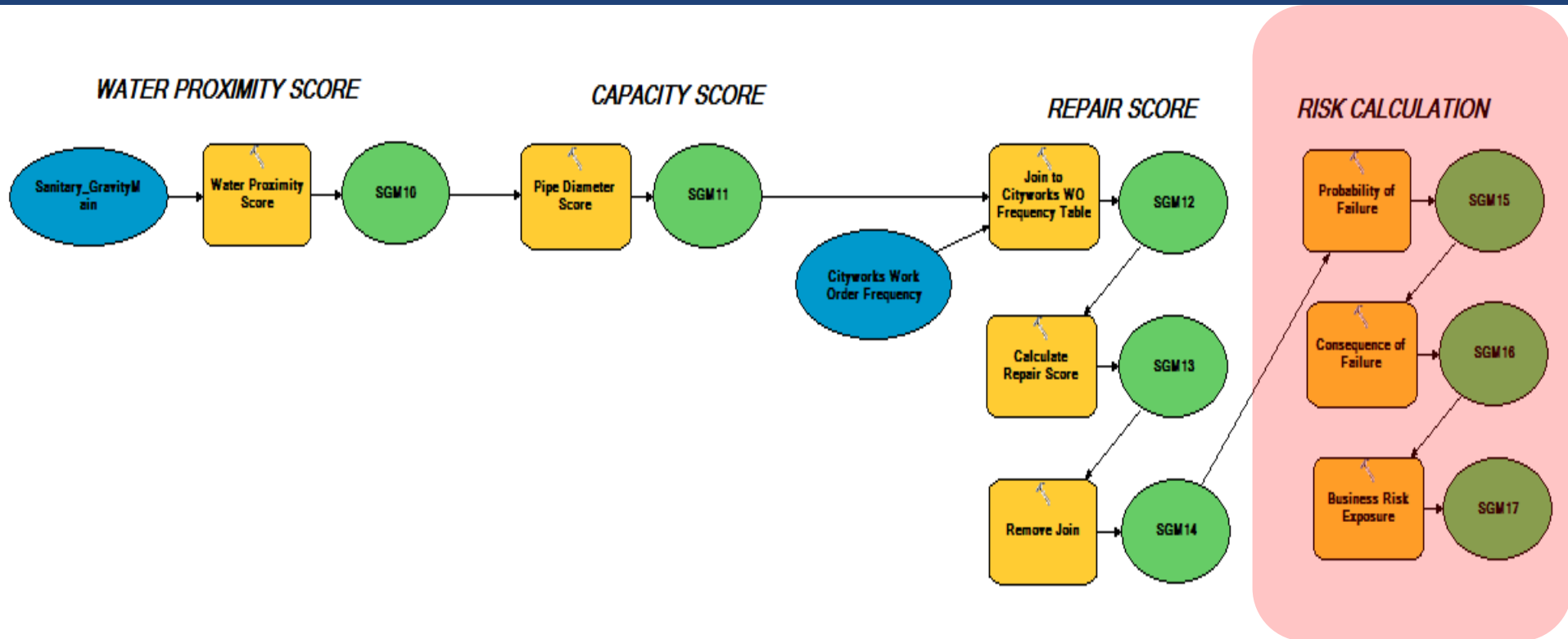


CONDITION

Asset Risk

Model Builder to calculate Asset Risk factor
(Business Risk Exposure - BRE)

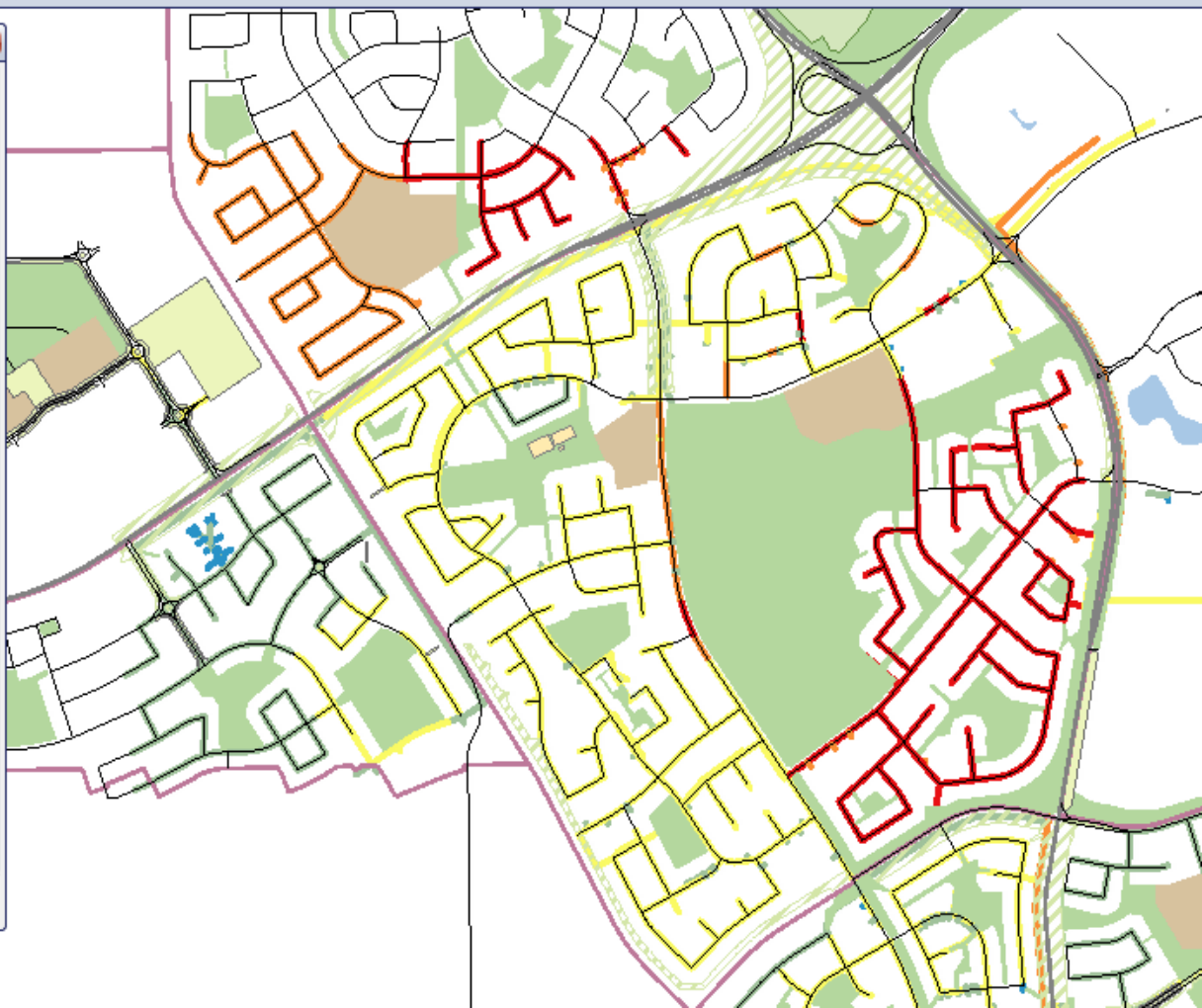
Sewer Main BRE Model



Legend

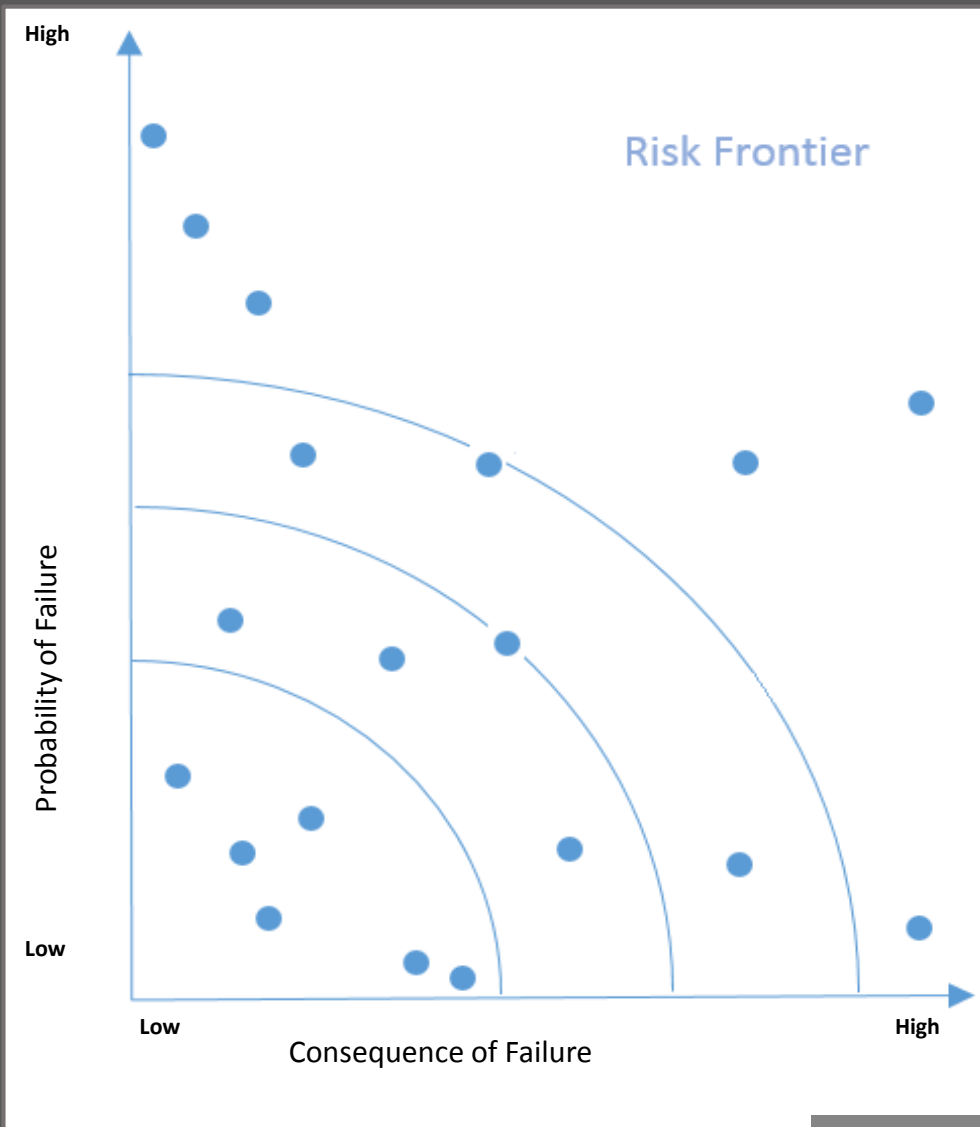
- Probability of Failure
 - 0 - 25
 - 25 - 40
 - 40 - 60
 - > 60
- Consequence of Failure
 - 0 - 50
 - 50 - 65
 - 65 - 75
 - 75 - 90
 - 90 - 100
- Business Risk Exposure
 - 0 - 30
 - 30 - 40
 - 40 - 50
 - 50 - 60
 - > 60
- Risk Calculation Area
- Water Main Analysis
- WM with Open WO

Flat



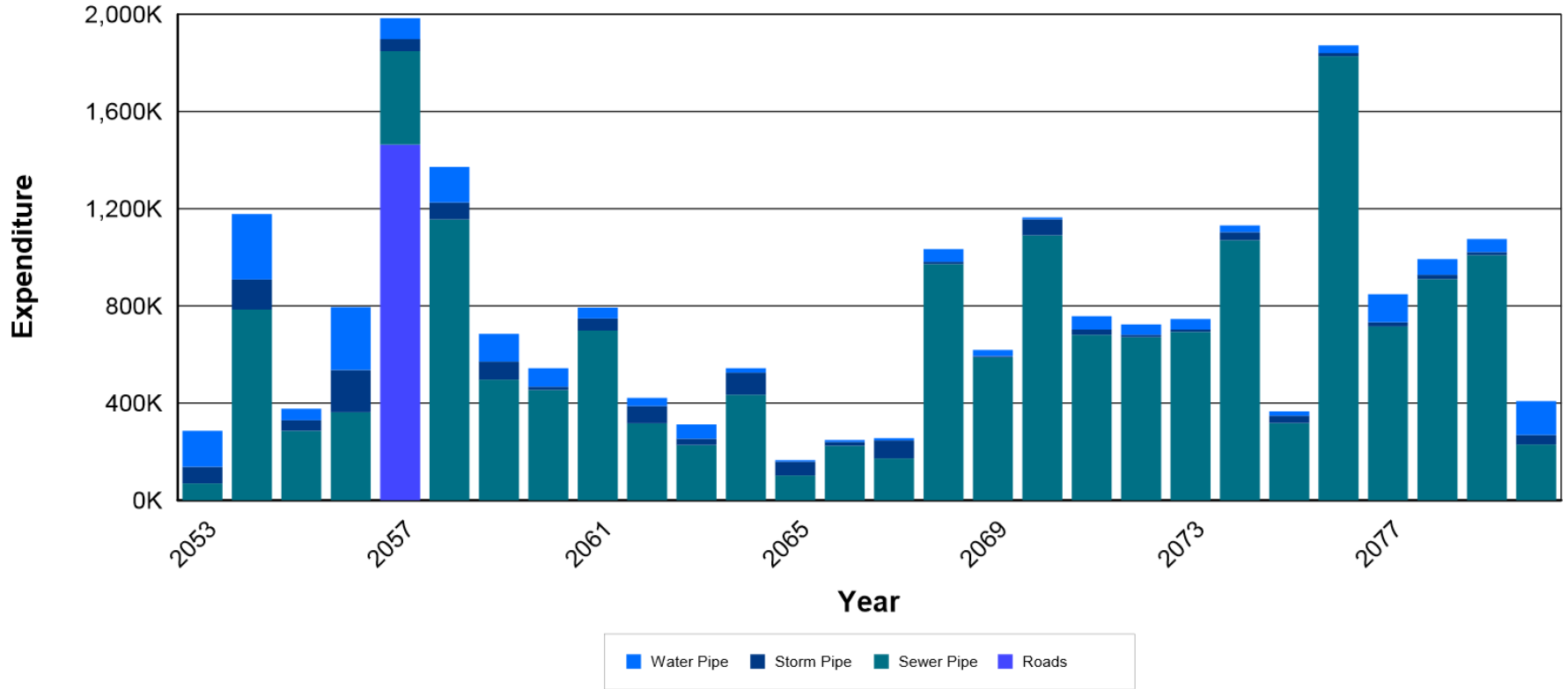
RISK FRONTIER

Condition



RISK FRONTIER

Forecasted Capital Expenditures



PORTLAND WATER BUREAU:
Further advances in asset management
would benefit ratepayers

June 2012

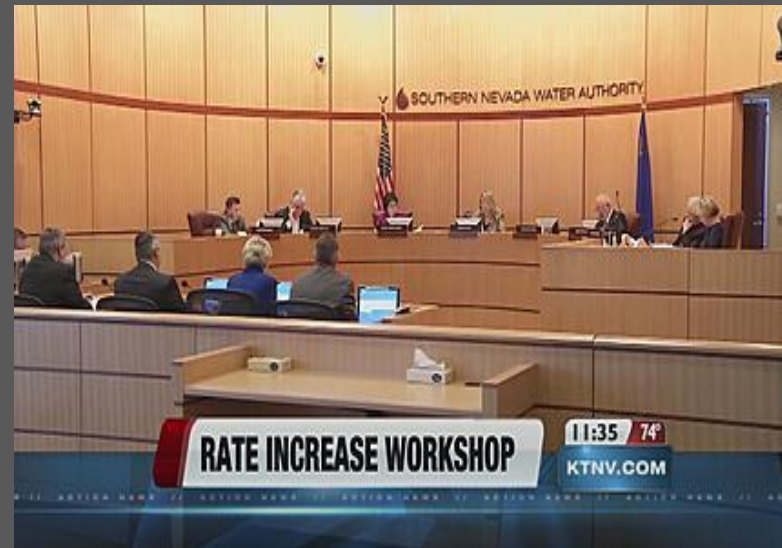
**CITY OF PORTLAND
2012 CITYWIDE ASSETS REPORT
Status and Best Practices**



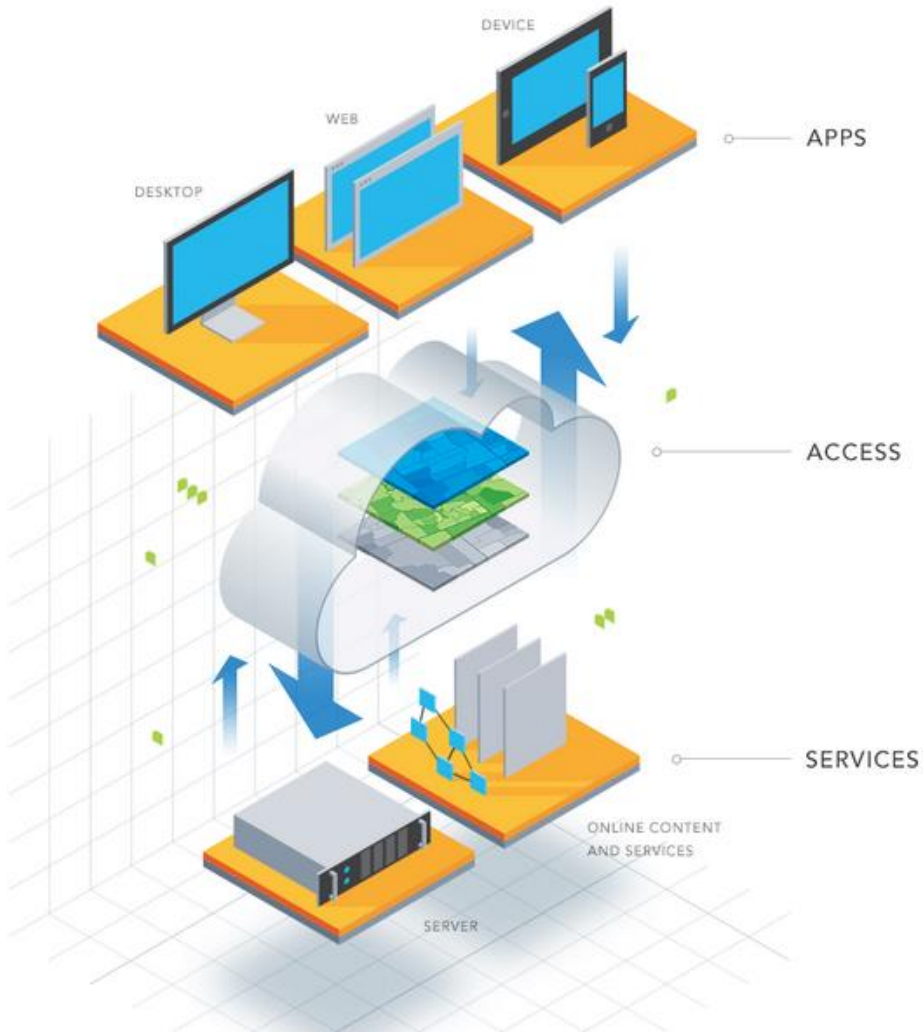
Sponsored by:
Bureau of Environment
Bureau of Planning and
Bureau of Transportation

PORTLAND WATER BUREAU
CIP ANNUAL REPORT
FY 2012-2013

OCTOBER 2013

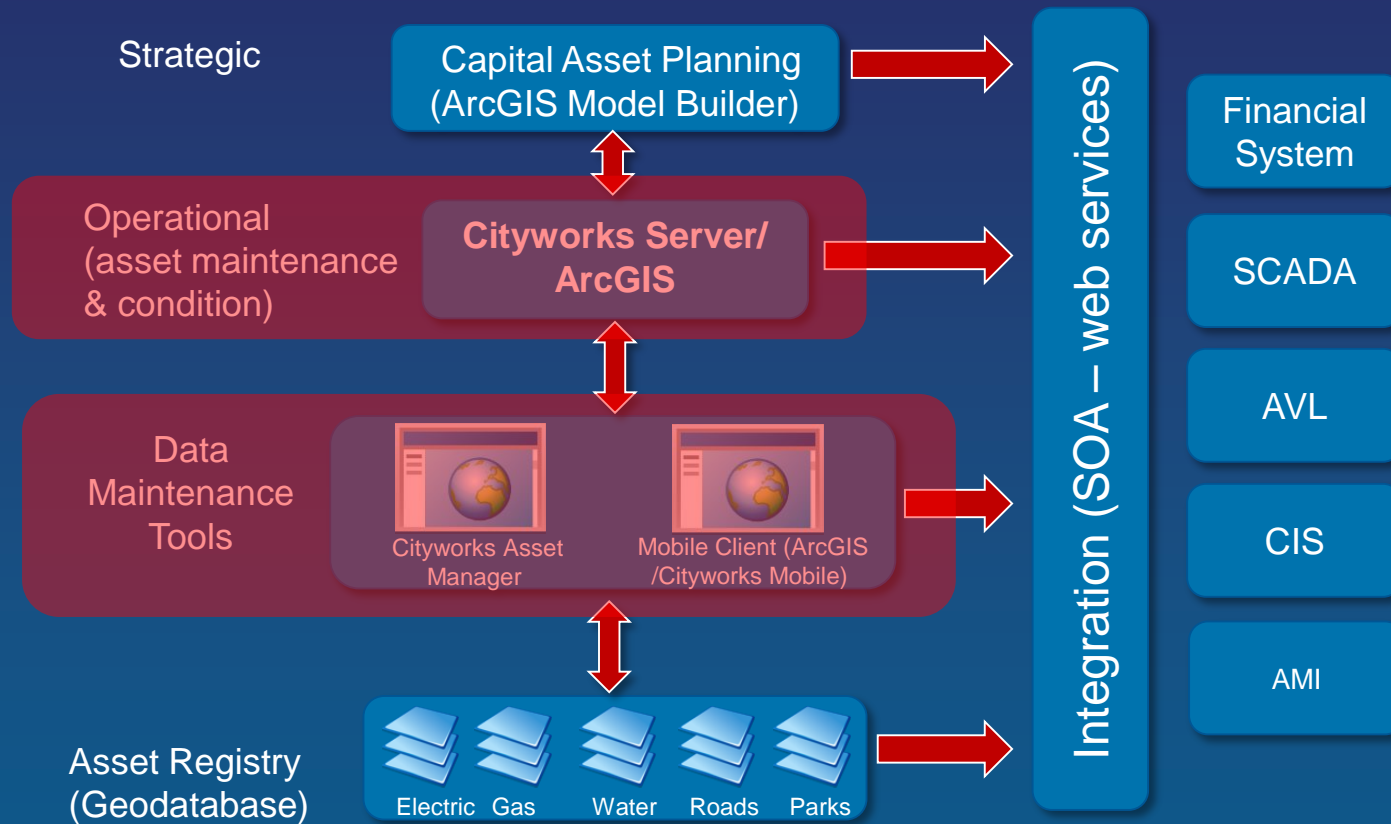


esri® Platform



Cityworks®

Asset Management Framework



GIS-CENTRIC PLATFORM

Authoritative and
System of Record



Web Services

- Home
- Authentication
- AMS
 - Attachments
 - Condition
 - Contractor
 - Crew
 - CustomerCall
 - Employee
 - Entity
 - EquipmentCost
 - Equipment
 - Inspection
 - LaborCost
 - MaterialCost
 - Material
 - Preferences
 - Reading
 - RecentActivity
 - Relates
 - Search
 - Security
 - ServiceRequest
 - Tasks
 - WorkOrder
 - Types
- PLL
 - CaseAddress
 - CaseCondition
 - CaseContractor
 - CaseCorrections
 - CaseCorStatus

Methods

AddComments (Returns String) ▾

AddEntities (Returns List<String>) ▲

Add entities to an existing work order

Accepted parameters:

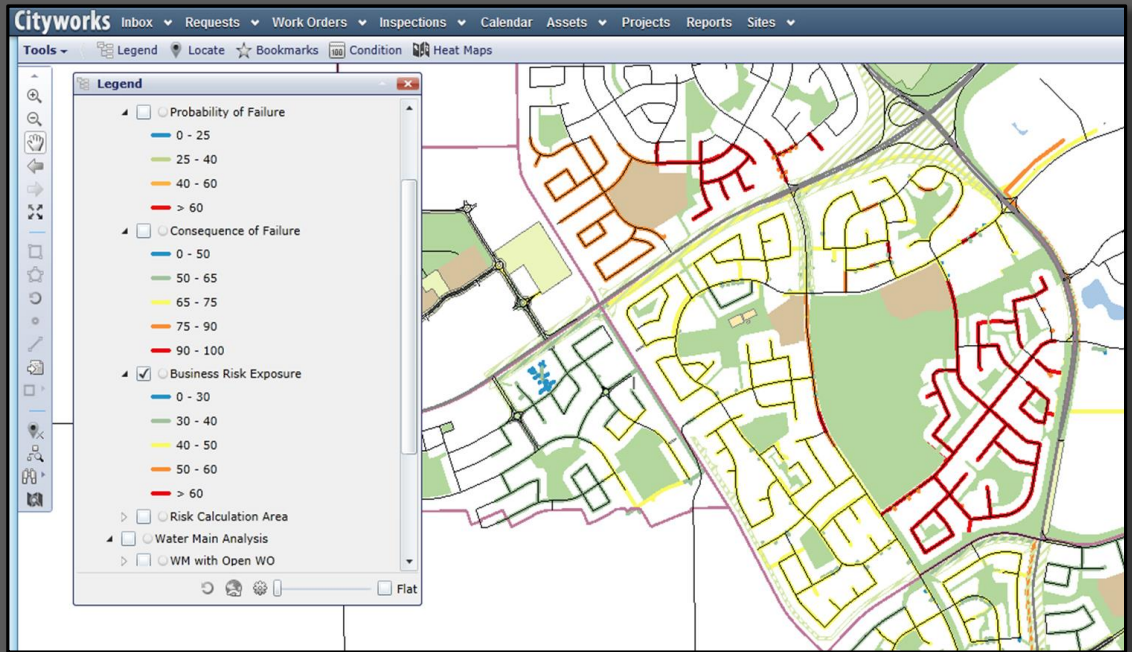
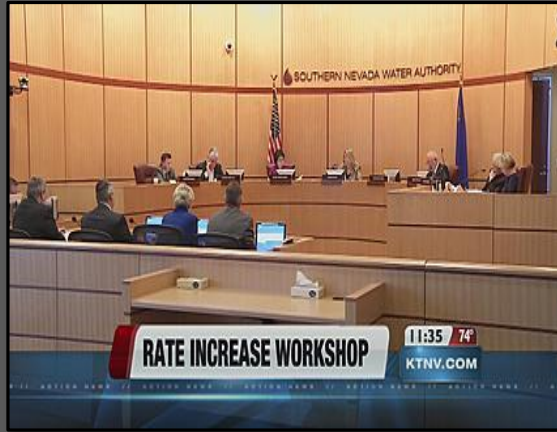
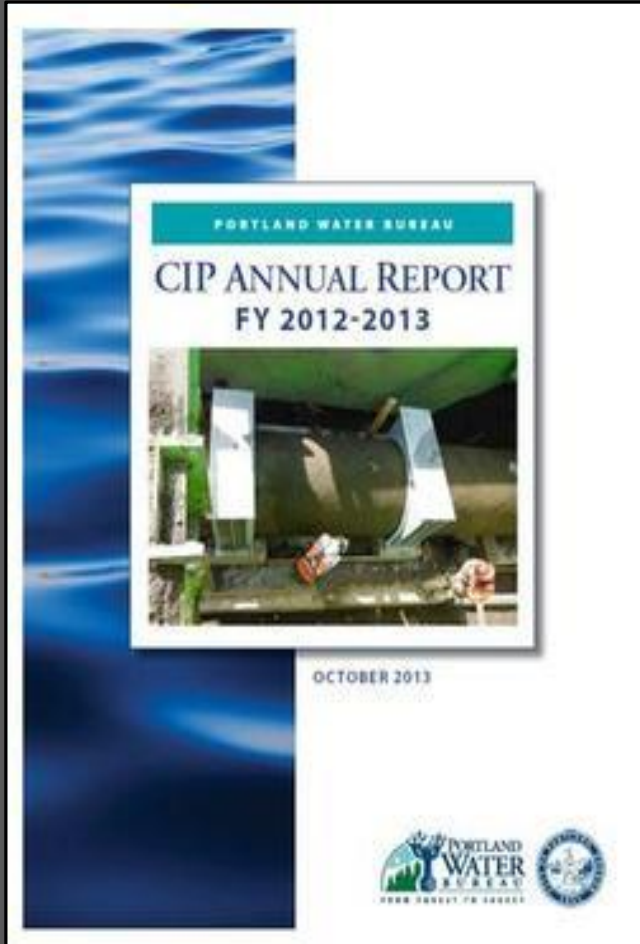
(String)	WorkOrderId		
(String)	EntityType		
(List<String>)	EntityUids		
		Update work order	
		xy after	<i>Added: 2014</i>
(Boolean)	UpdateXY	adding entities, default is true.	

Required Fields: WorkOrderId, EntityType, EntityUids

Available Since: 2014

ById (Returns WorkOrderBase) ▾

ByIds (Returns List<WorkOrderBase>) ▾



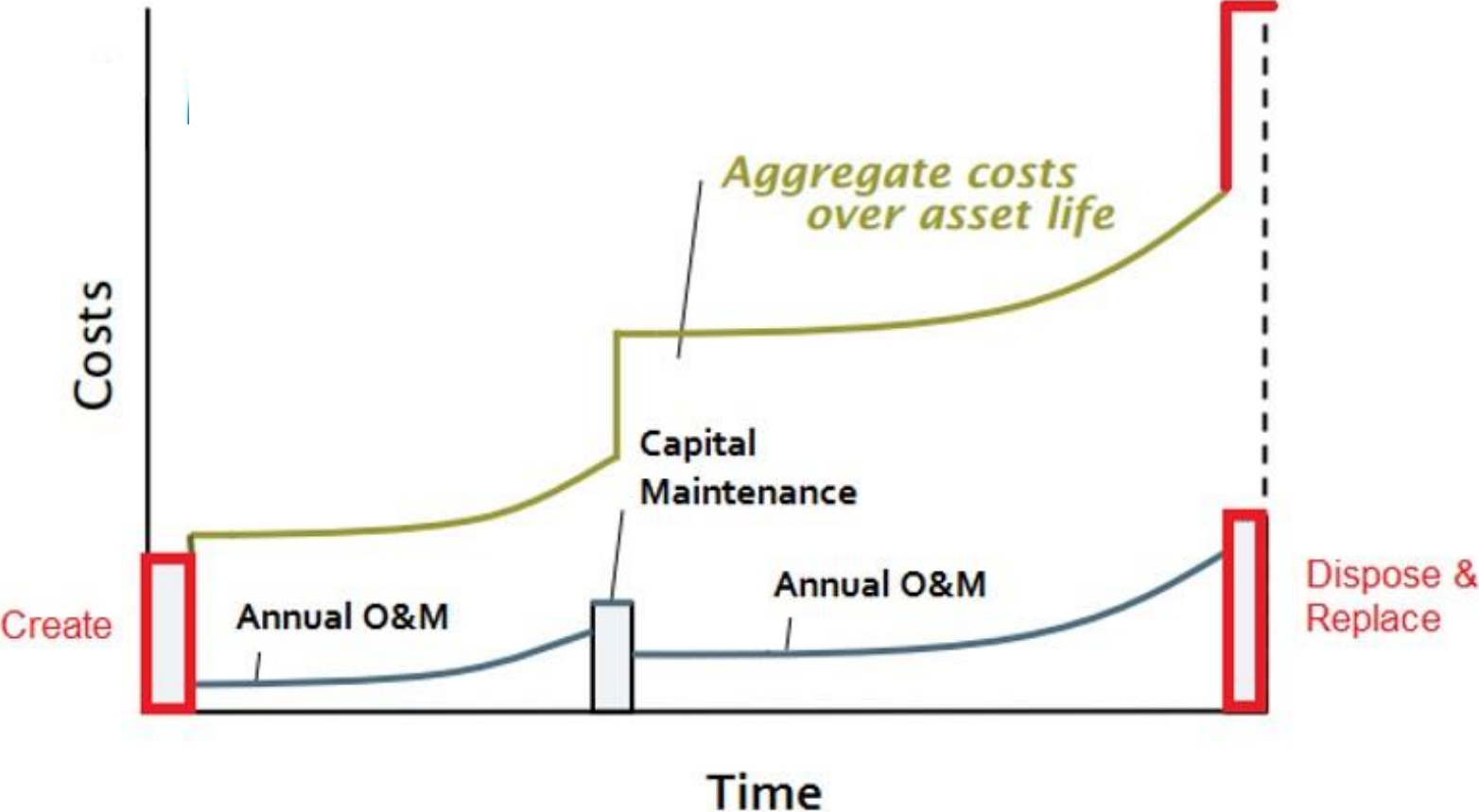


Can We Conduct Operations & Maintenance Using the Same Best Practices Framework?

Cityworks Maintenance Score™



The Operation & Maintenance phase of an asset's life is as expensive (sometimes far more) as its construction or replacement.



WE MUST DO MAINTENANCE

**REALIZE FULL
ASSET LIFE** + **PROVIDE LEVEL OF
SERVICE OVER LIFE** = **VALUE**

Realize Full Asset Life



Provide Level of Service Over Life



The ill-fated, warped U10 g
bridge. June



Annual Operations Budget

2. 674 Valves (8550 valve)						
Tasks	Unit of Production (UOP)	Labor Requirement (per UOP)	Total Hours (per UOP)	2008 Totals Jobs completed	2009 Total Jobs Scheduled (L.O.S.)	Completed Nov 1 2009
Exercise/Flush Valves	1	.25 Hours X 2 People	0.5	Exercise and flushed (2400 valves)	Exercise/Flush each valve 2.5 years (3000 jobs)	2348
Field Inspect	1	5 Hours x 2 people	10	Field inspect jobs (68 Jobs)	Field inspect jobs (75 Jobs)	46
New valve Installation	1	6 Hours X 4 People	24	New installs (25 Jobs)	Proactive - address areas that don't meet our standard (18 jobs)	12
Repair valves	1	4 Hours X 2 People	8	Repair only when leaking (17 jobs)	Repair only when leaking (25 jobs)	20
Replace - valve	1	6 Hours X 4 People	24	Install new valve when it fails (25 jobs)	Install new valve when it fails (25 jobs)	15
Valve Box Work	1	2 Hours X 2 People	4	Repair only when needed (127 jobs)	Repair only when needed (140 jobs)	118
General Maintenance - Cleaning service vans, ordering supplies, as builds, vector site etc	1	2 Hours X 2 People	4	Misc. work (46 jobs)	Misc. work related to valves (50 jobs)	23
PRV Maintenance	1	4 Hours X 2 People	8	N/A	Help Steve Coke when needed (6 jobs)	1



Legend

- Heat Maps
- Cityworks Events
- Lethbridge3
- Reporting Layers
 - Sanitary Gravity Main Risk Analysis
 - Probability of Failure
 - 0 - 25
 - 25 - 40
 - 40 - 60
 - > 60
 - Consequence of Failure
 - 0 - 50
 - 50 - 65
 - 65 - 75
 - 75 - 90
 - 90 - 100
 - Business Risk Exposure
 - 0 - 30
 - --

Flat

Heat Maps

Enable heat map for selected graphic layers.

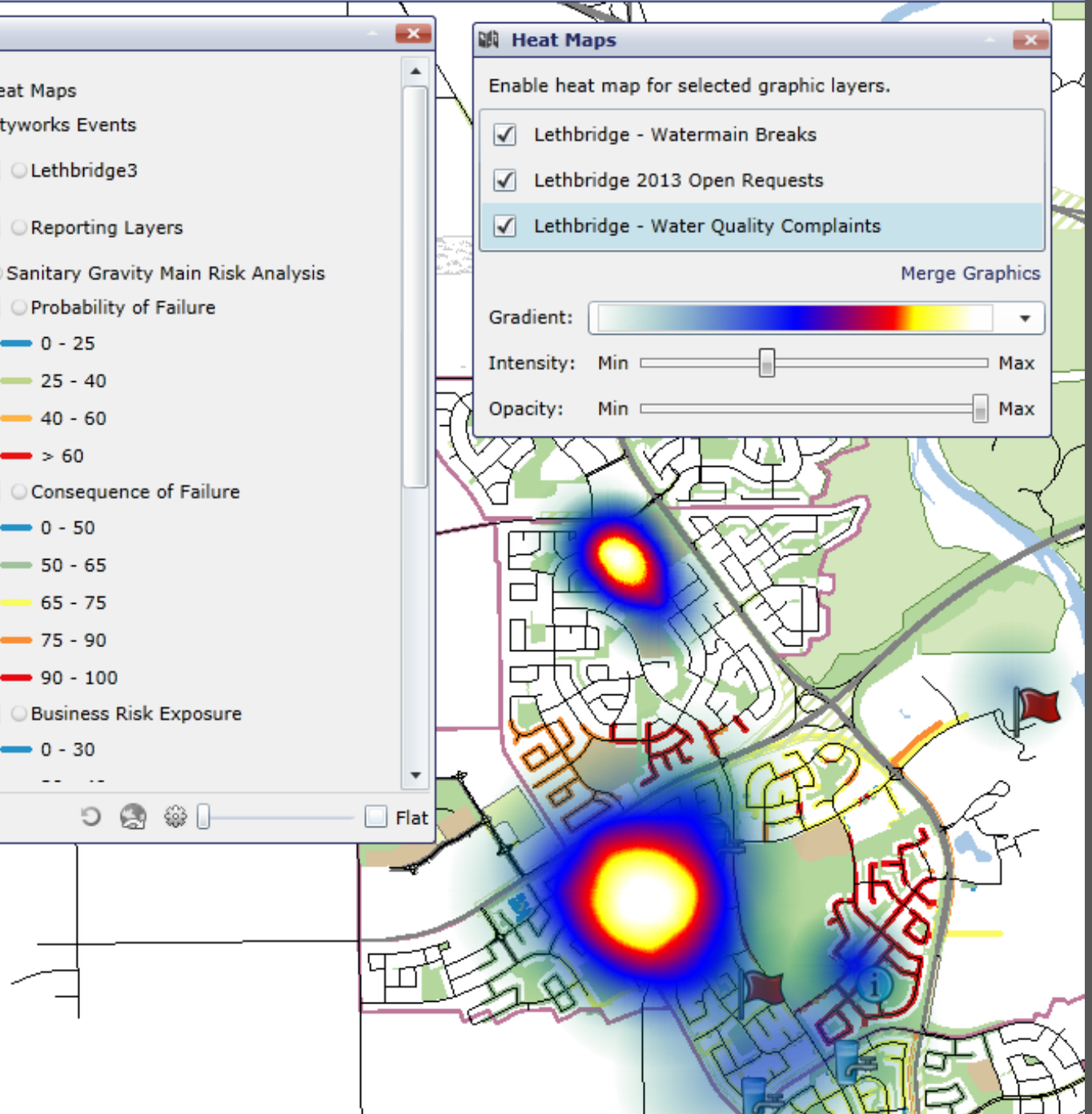
- Lethbridge - Watermain Breaks
- Lethbridge 2013 Open Requests
- Lethbridge - Water Quality Complaints

Merge Graphics

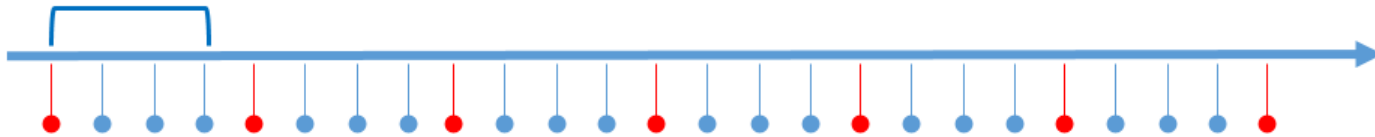
Gradient:

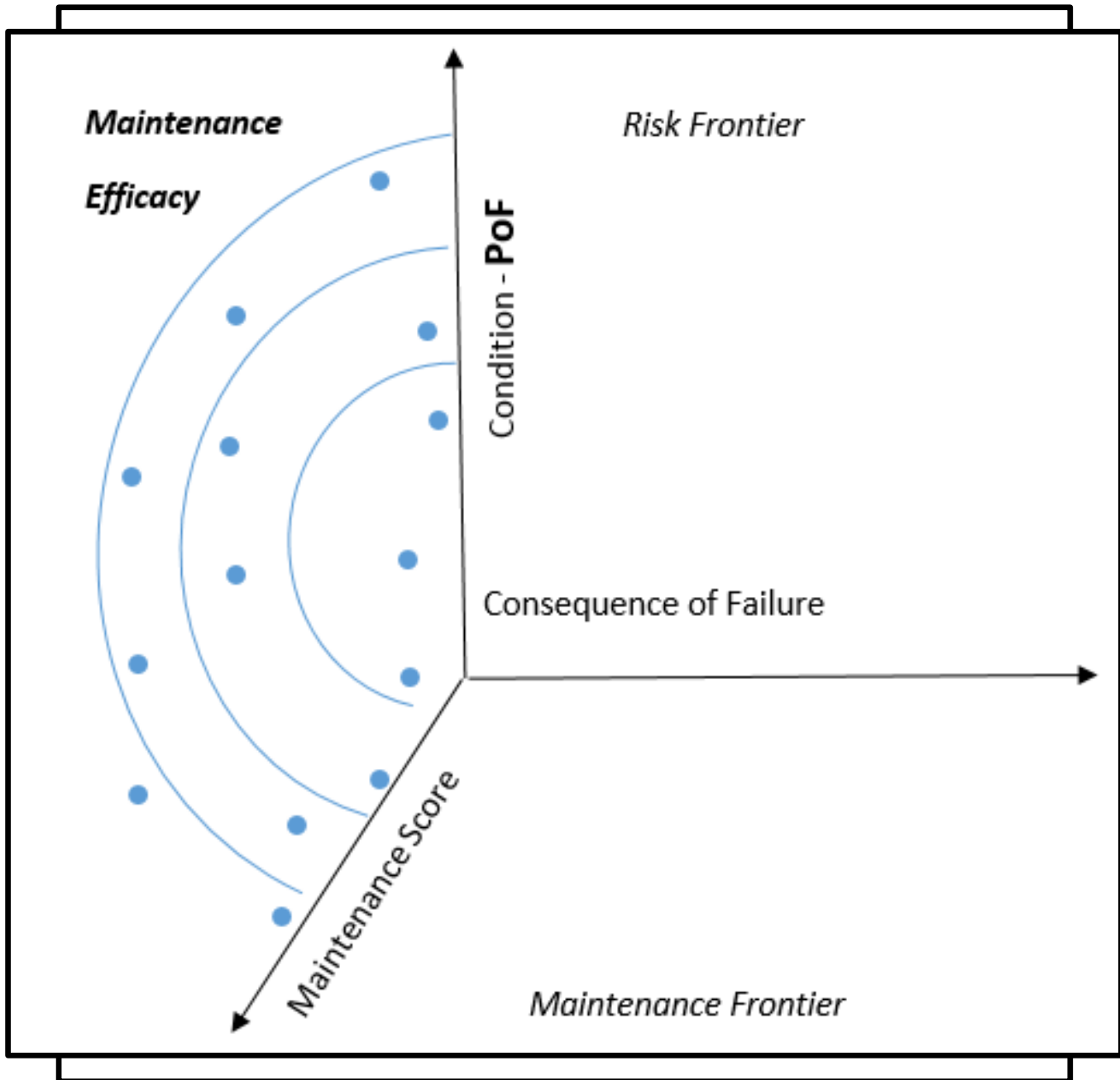
Intensity: Min Max

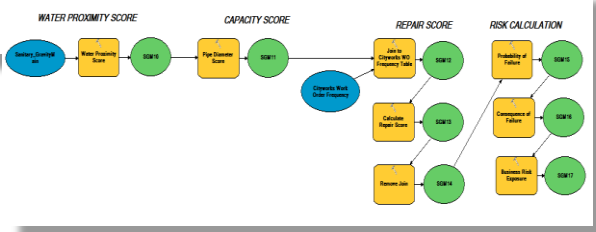
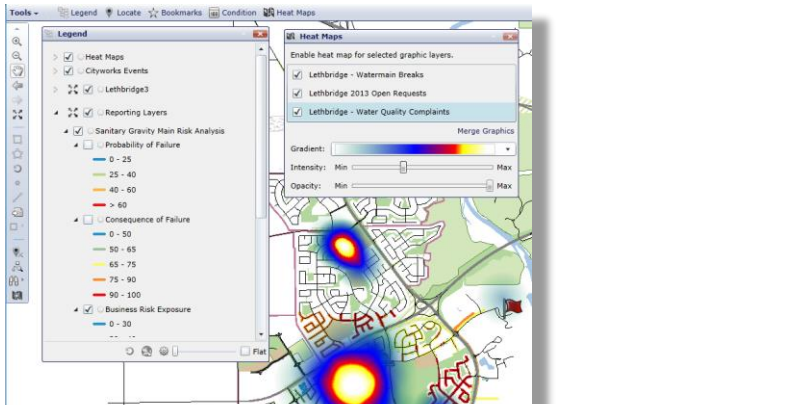
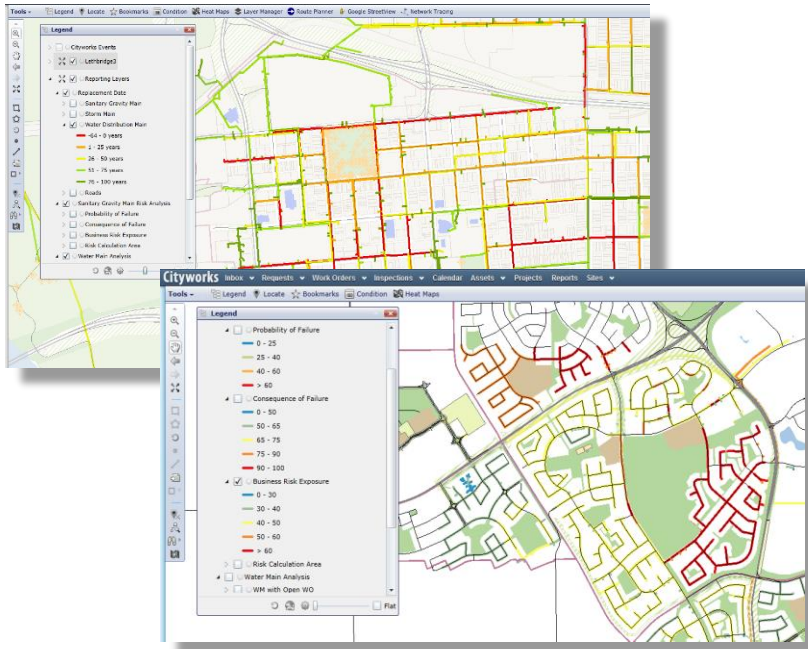
Opacity: Min Max



4 Year Cycle







MAINTENANCE STRATEGY MANAGER

Group: **WATER** Type: **[]**

Feature Object

Active Strategies

Feature / Object	Template	Date Created	# WO Template	WO Count
Hydrant	CW	14.10.24	10.24.14	3
Main - Distribution	CW	12.09.06	09.06.12	5
Main - Transmission	RVA	09.04.13	04.13.09	7
Pump Type 1	CW	05.01.12	01.12.05	11

Clone Edit Make Inactive

Inactive Strategies

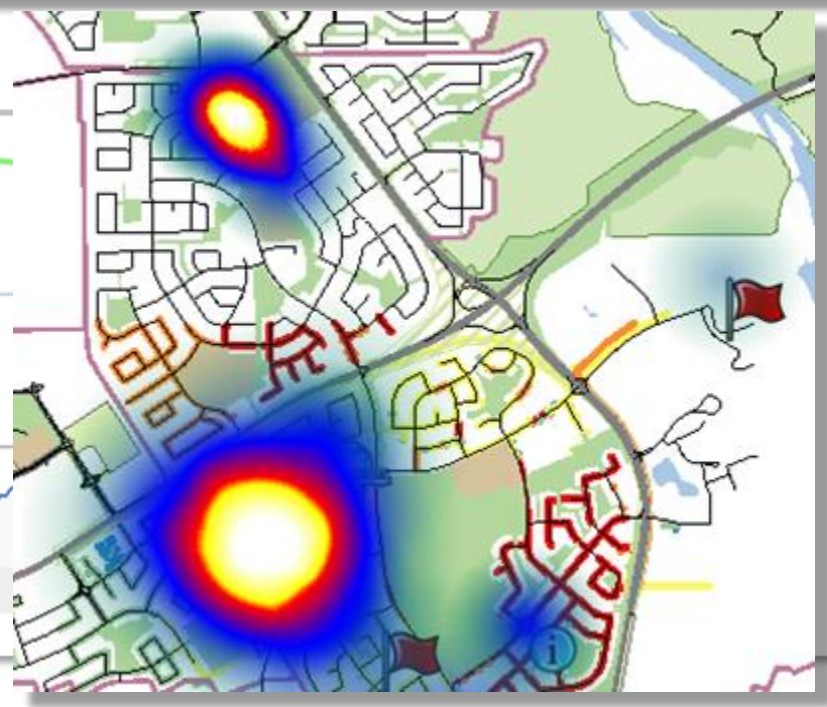
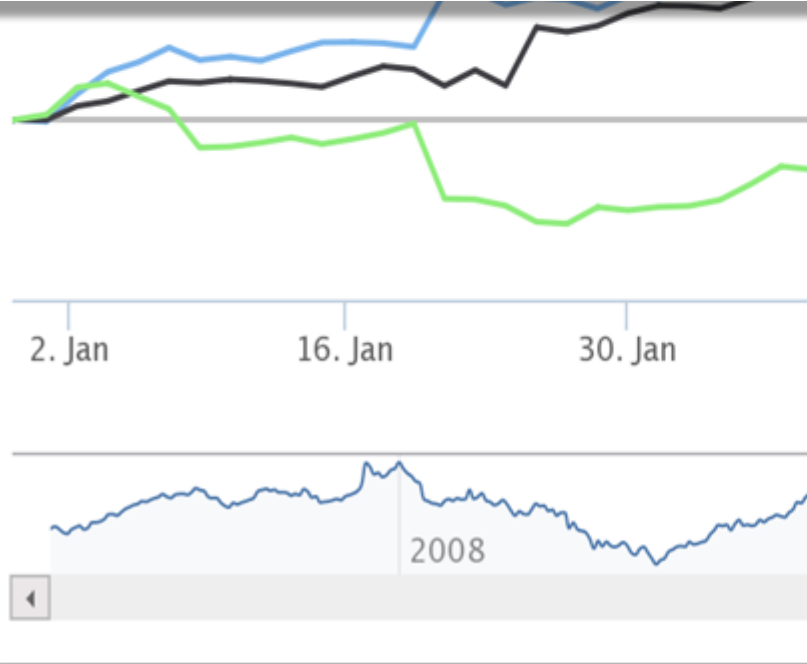
Feature / Object	Template	Date Created	# WO In Template	WO Count
Hydrant	CW	14.11.04	11.04.14	4
Hydrant	CW	09.01.01	01.01.09	4
Hydrant	INN	13.07.14	07.14.13	9
Hydrant	RVA	13.06.23	06.23.13	7

New Clone Edit Delete Make Active

Maintenance Score

Asset Group	Asset Count	0.0 - .19	.20 - .39	.40 - .59	.60 - .79	.80 - .99	1.00 - 1.19	1.20 - 1.39	1.40 - 1.59	1.60 - 1.79	1.80 - 2.00	> 2.00
Water	Scored	71,094										
	Unscored	17,234										
Hydrant	Scored	7,648	12	27	33	94	977	1,106	142	130	58	6
	Unscored	897										0
Main - Dist	Scored	1,293	0	4	1	111	654	982	881	447	92	48
	Unscored											16
Main - Trans	Scored	7,648	0	3	24	86	307	214	77	144	138	17
	Unscored	897										4
Main - Dist	Scored	1,293	0	0	3	62	197	156	25	23	19	17
	Unscored											12

CSV



The Gap – What is realistic

Asset Management

- 200 ft pipe
- 2% chance of failure in 10 yrs.
- \$30,000 in direct costs
- \$10,000 in indirect costs
- Risk Cost
 $(2\% \times \$40,000) / 10\text{yrs} = \80yr.

Maintenance Plan

- 200 ft pipe
- CCTV every 5yrs
- \$2.50/ft
- Maintenance Cost
 $(200\text{ft.} \times \$2.50) / 5\text{yrs} = \$100/\text{yr.}$

**Why spend \$100 to avoid \$80 dollars of risk?
Change your maintenance strategy.**



Cityworks
Empowering GIS™

Password

Log In

Forgot Password

url

url

311

\$









Cityworks[®]

Empowering GIS for Public Asset Management™

Extending The GIS Platform Water / Waste Water Asset Management

***The Authoritative Platform For Emerging Infrastructure
Management Standards***




WHAT DO WE OWN? WHAT IS IT WORTH? WHAT CONDITION IS IT IN?

THE CITY OF CALGARY 2010
INFRASTRUCTURE STATUS REPORT

calgary.ca | call 3-1-1



CANADA & ABROAD



Infrastructure gap breakout (\$billion)

Category	Value (\$billion)
GROWTH	3.31
MAINTENANCE	3.23
OPERATING	0.86

What do we spend and what should we be investing? \$16.7 billion is being spent over the next 10 years. \$24.1 billion is required.	What is the infrastructure gap? The 10-year infrastructure gap is \$7.4 billion. The gap has dropped from the \$10.4 billion gap reported in 2007. The breakout of the infrastructure gap is shown in the chart above.	How do we get sustainable infrastructure? Continued Council and corporate support and focus on asset management strategies, policies and plans.	
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**WHAT IF I TOLD
YOU**

THE FRONTEND IS THE BACKEND?

