

Management of Assets at City West Water

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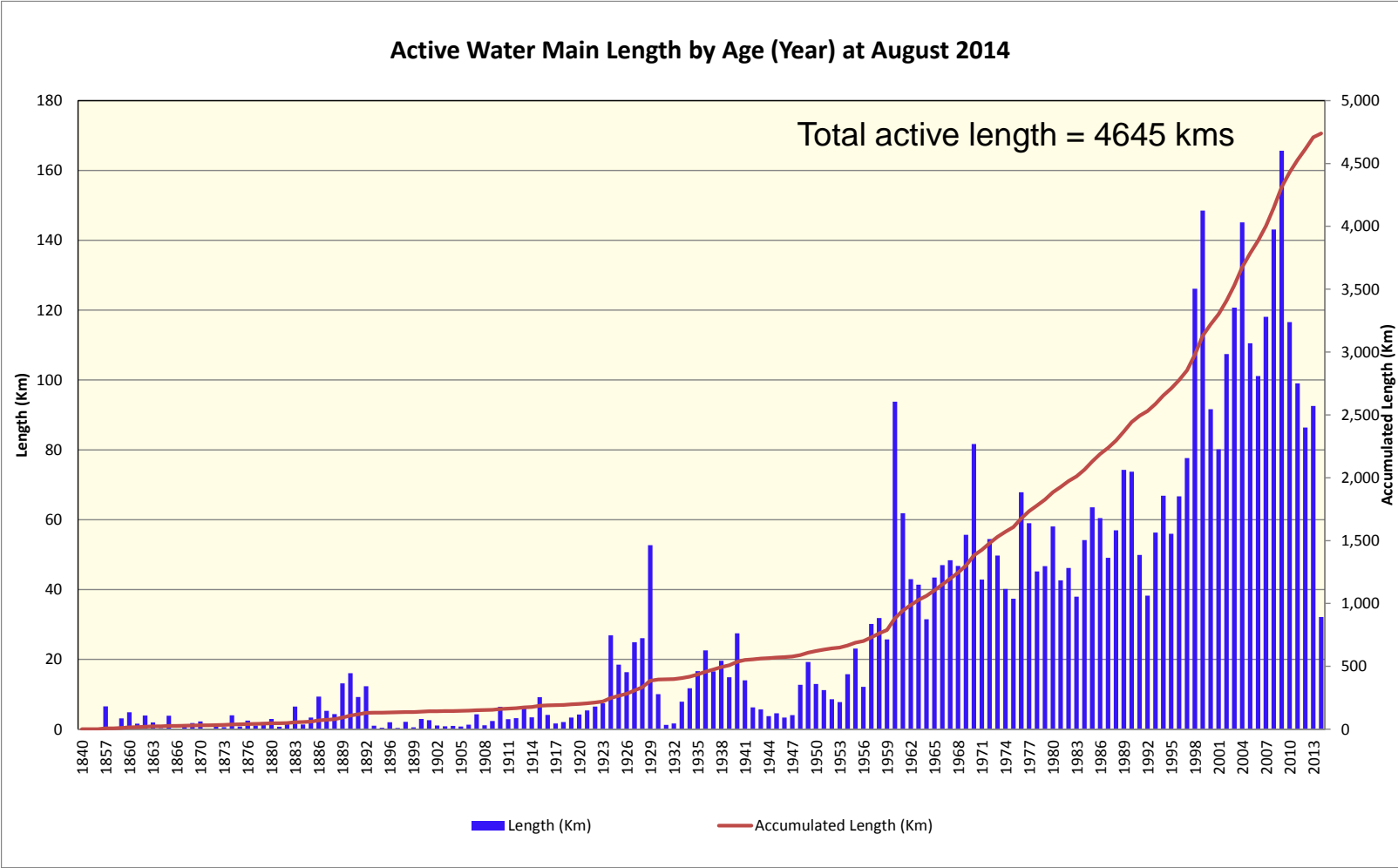
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Assets CWW manages

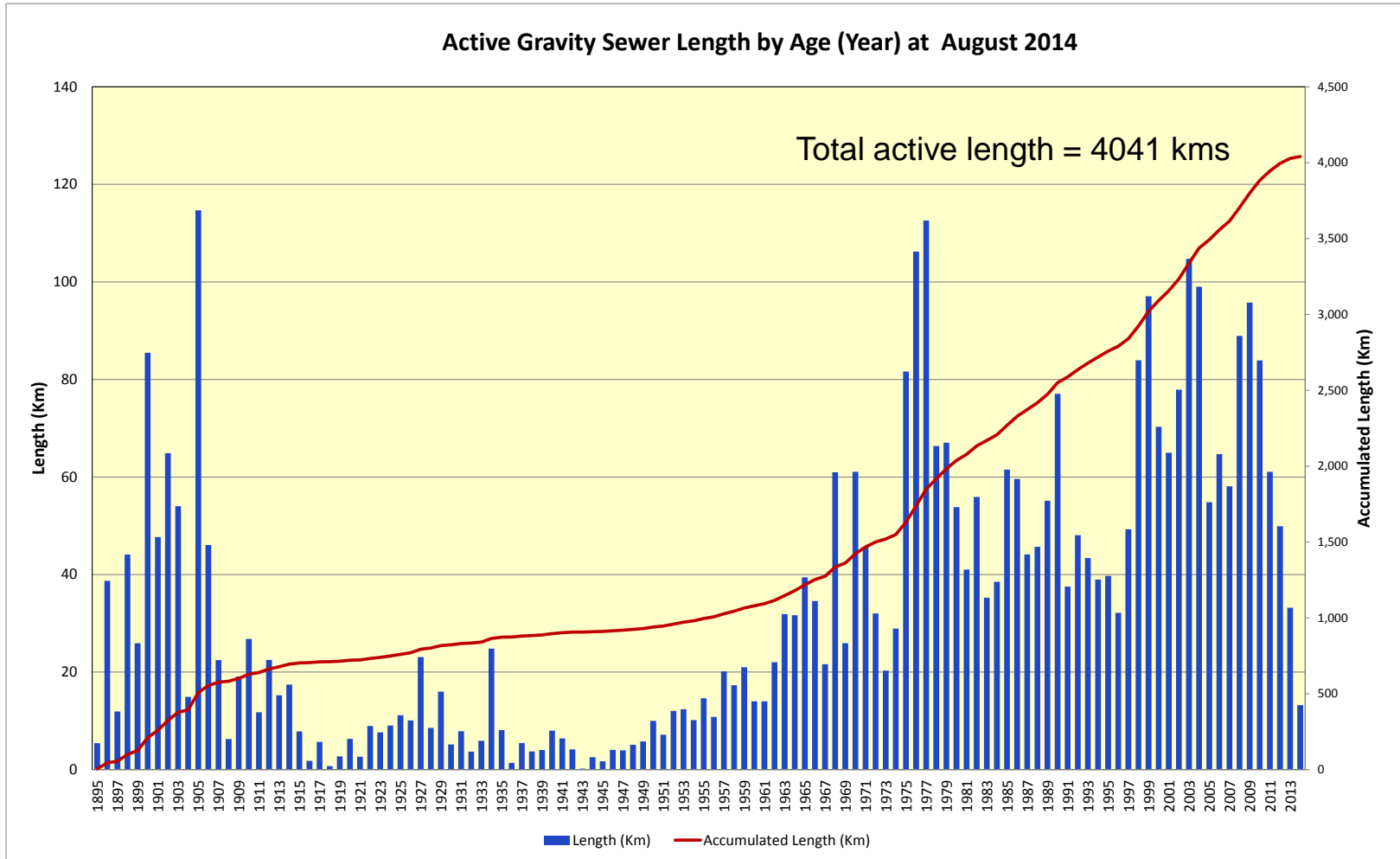
- Potable water supply assets
- Alternative water assets
- Sewerage assets



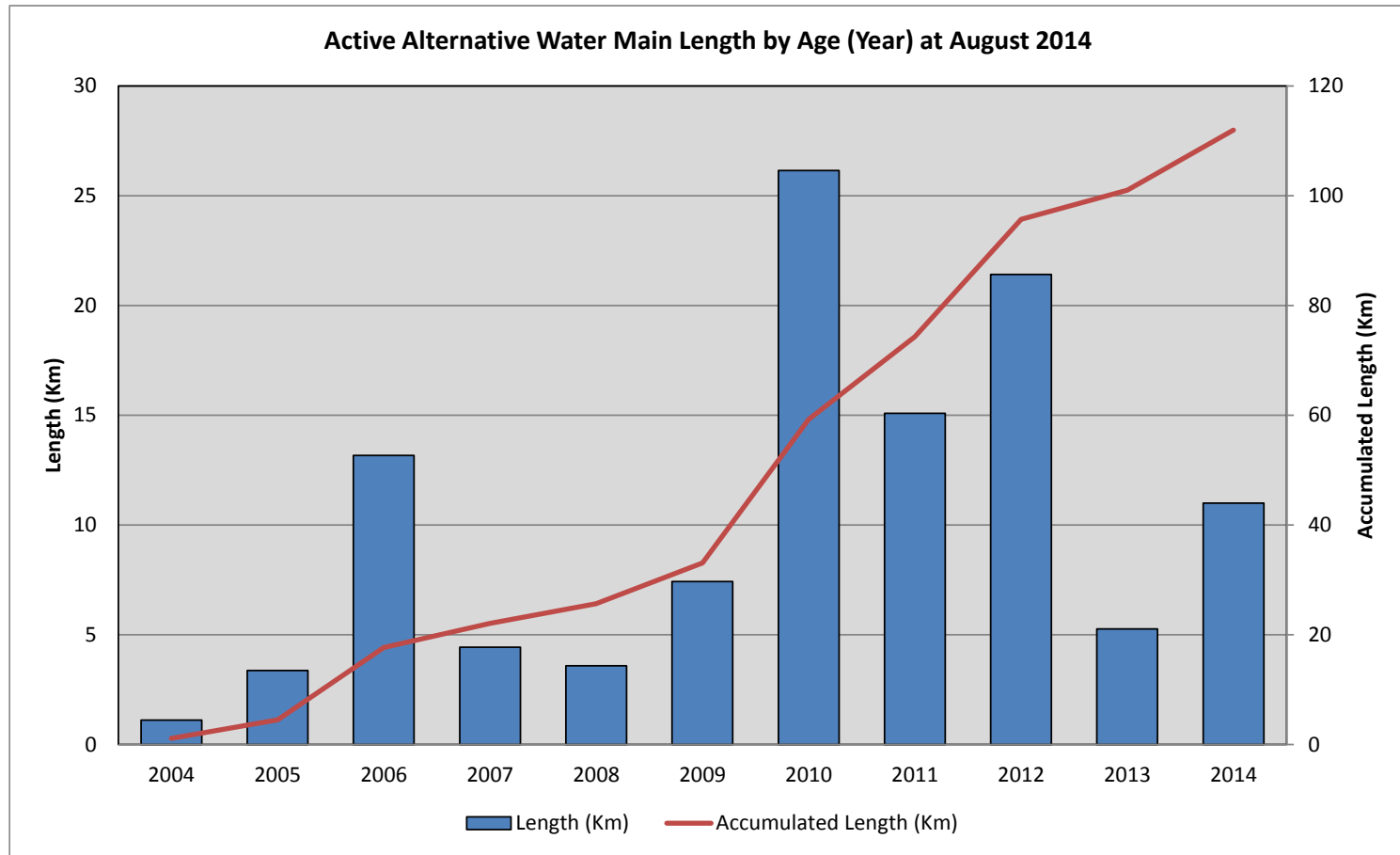
Length of Active Water Main by Year



Length of Active Sewer Main by Year



Length of Alternative Water Main by Year



CWW's Asset Management Policy

Applies to potable water, sewerage and alternative water assets

- Maintain the same level of service to our customers at lower cost
- Maintain the long term performance of our assets



Role of CWW in managing its assets

- Preserve asset functionality
- Preserve asset value
- Preserve and where possible enhance CWW's reputation



CWW must prevent critical pipe failures

Holtom Street, Princes Hill
750mm 1889 Riveted
Wrought Iron

Failure date – 10/01/1999





CWW manages the water & sewerage assets within Melbourne's CBD



Water mains under pressure can cause significant damage



Tamara Street, Albanvale
2/01/2013



Air valve failure
28/10/2012



Lancia Drive, Keilor
Downs 13/08/2013

Failures = disruption, damage and loss of reputation to CWW

Altona Road, Altona



Albert Street, East Melbourne 31/05/2013



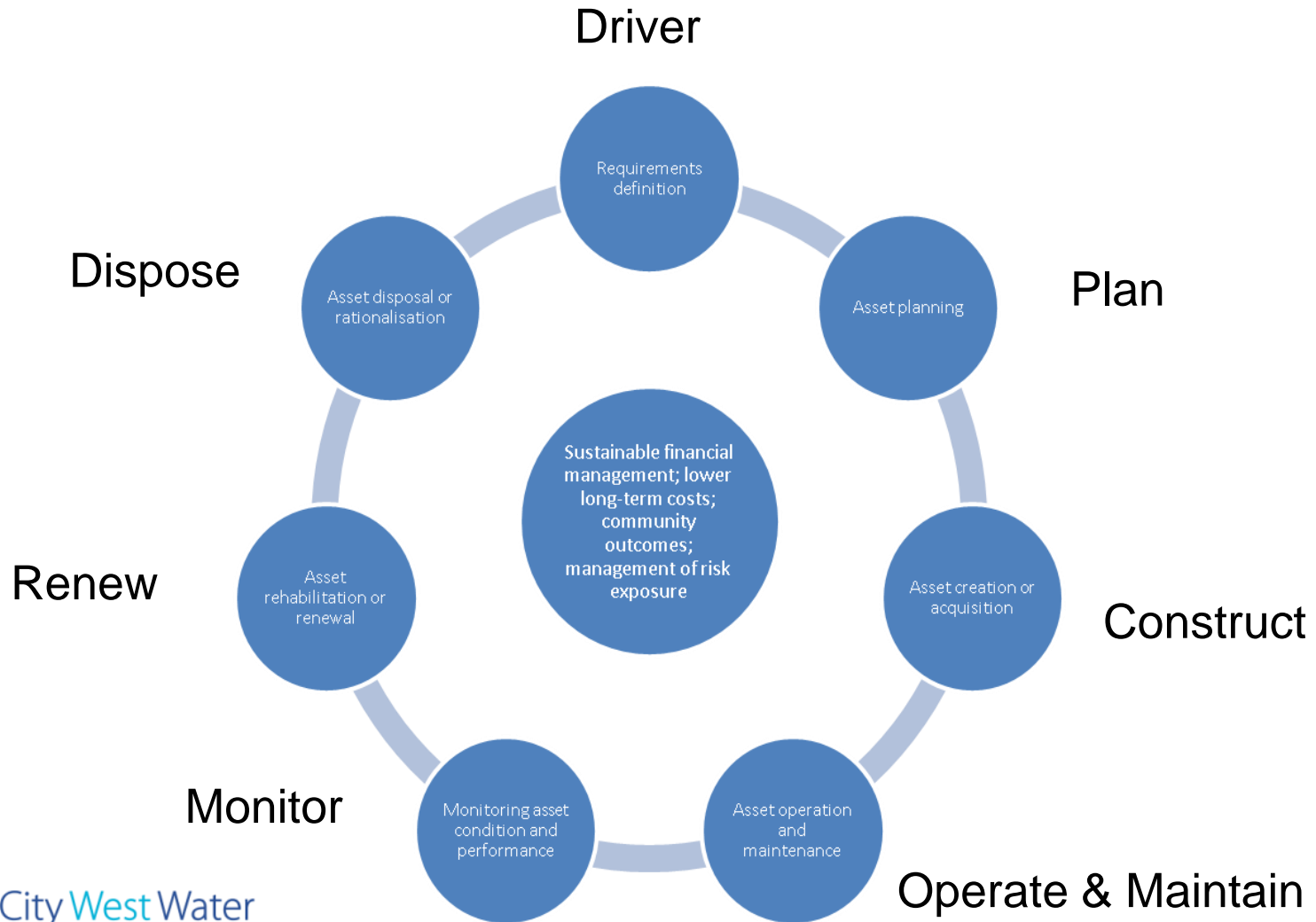
Burnley Street, Burnley 26/07/2007



Nicholson Street, Melbourne 12/08/2002



Asset life cycle – components of asset management



Asset management activities

CWW manages its assets through:

- Performance measurement and analysis
- Condition assessment
- Preventative maintenance
- Renewal
- Hydraulic upgrading to meet agreed customer levels of service for pressure and flow and to prevent environmental harm



Water supply assets we manage

Examples of water supply asset classes:

- Distribution & reticulation pipelines
- Property service connections
- Meters
- Valves
- Hydrants
- Booster stations



Sewerage assets we manage

Examples of sewerage asset classes:

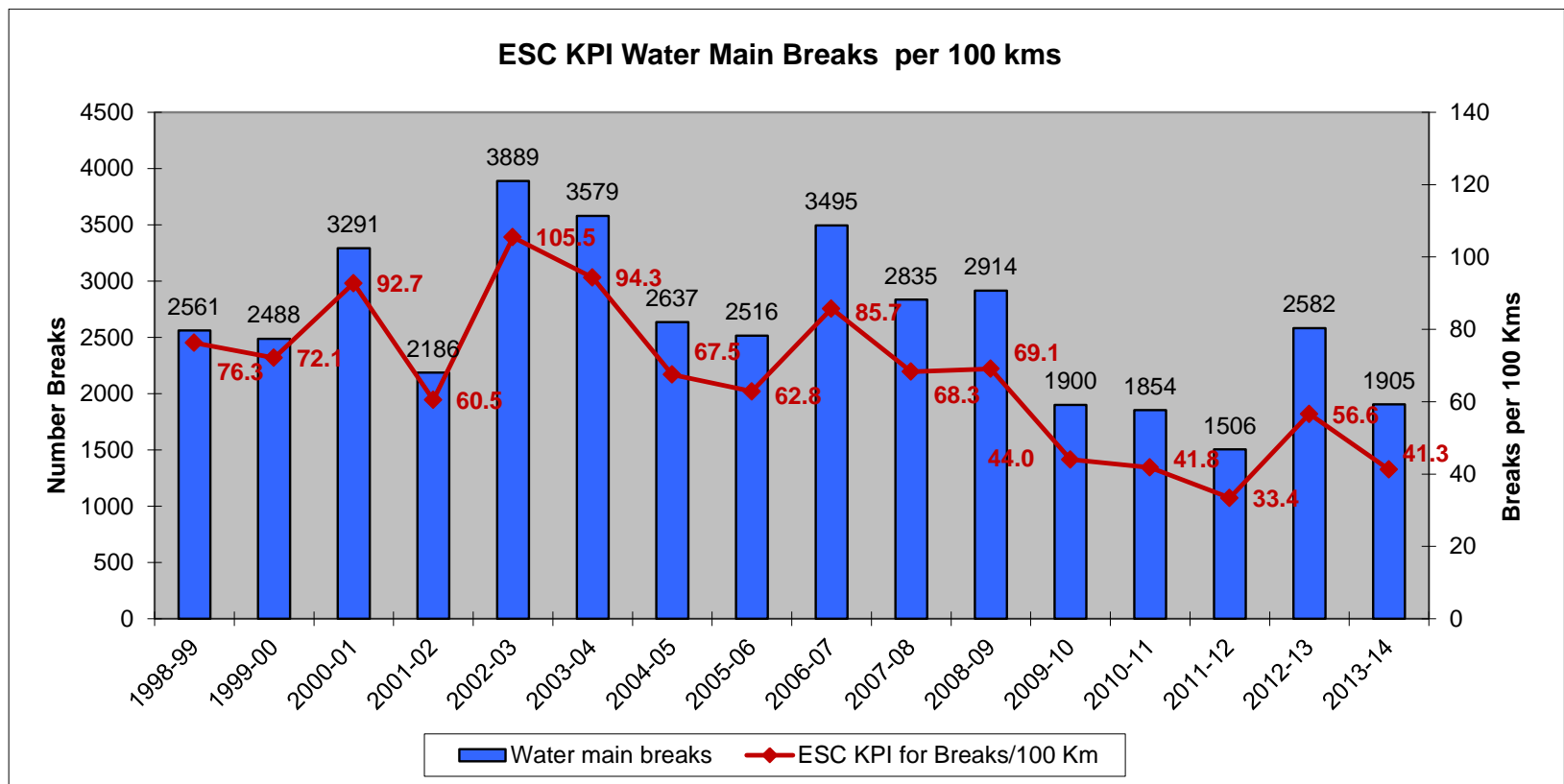
- Reticulation & transfer mains
- House connection branches
- Manholes, access chambers & inspection openings
- Vents
- Pump stations & rising mains



Asset performance measurement

How do we monitor asset performance?

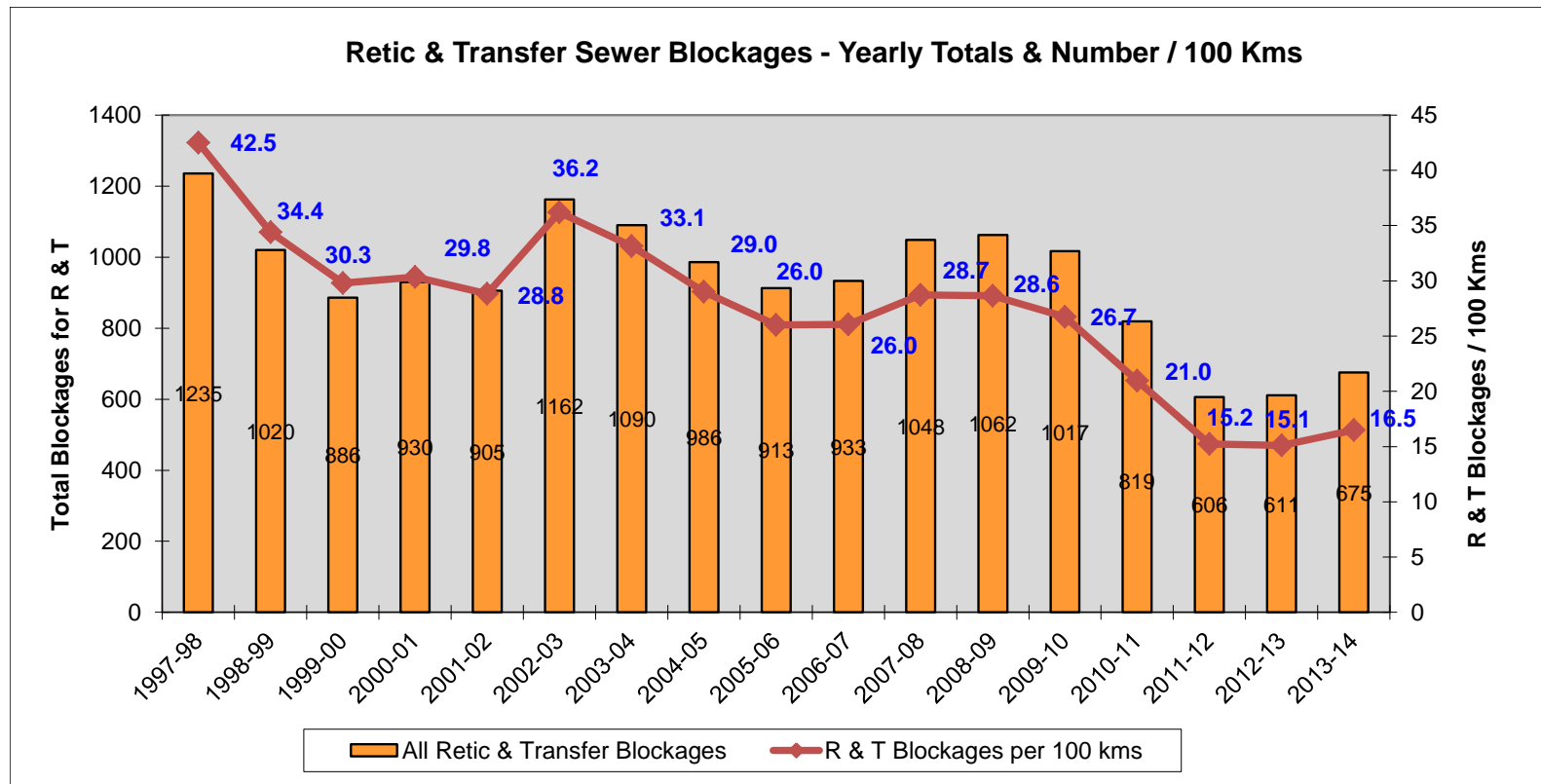
By the number of breaks and leaks on the water supply system / 100 km



Asset performance measurement

How do we monitor asset performance?

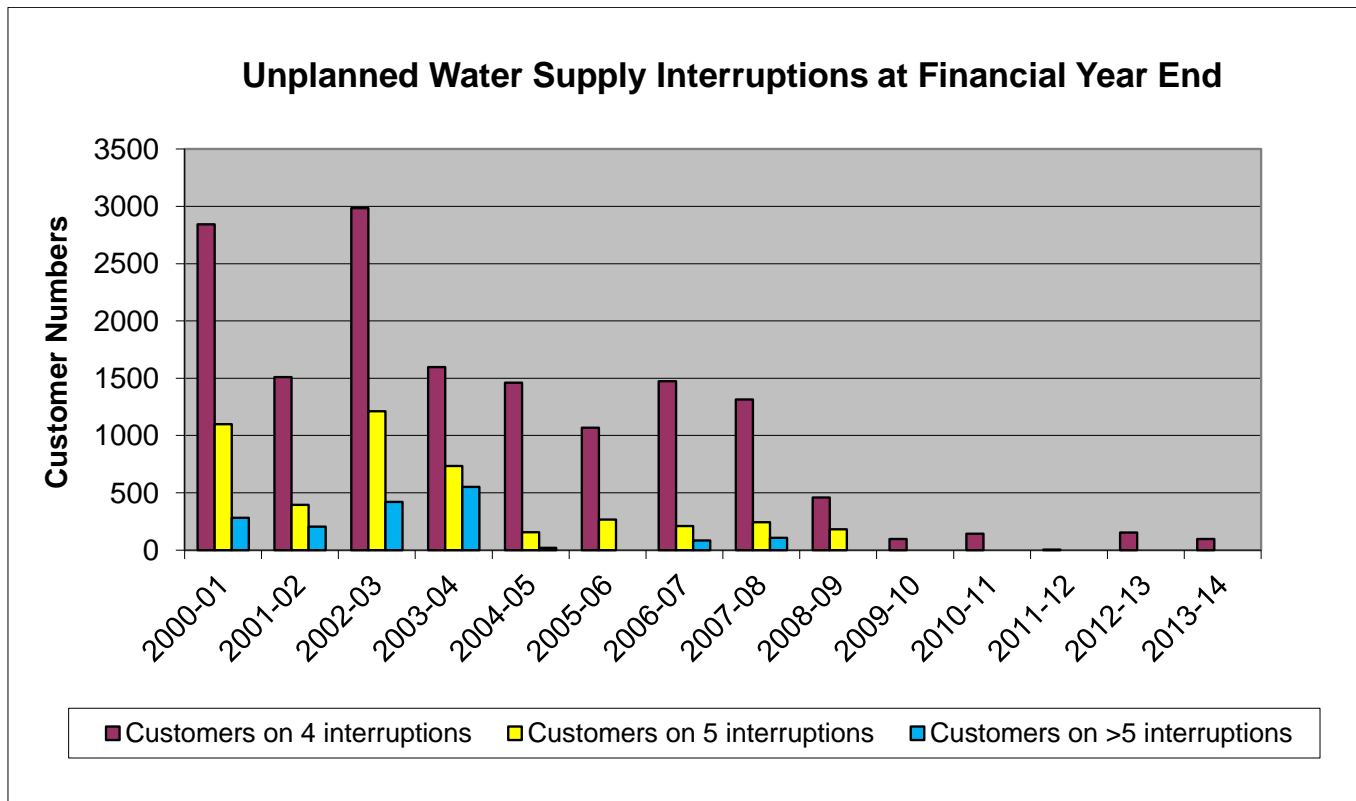
By the number of blockages on the sewerage system / 100 km



Asset performance measurement

How do we monitor performance cont....?

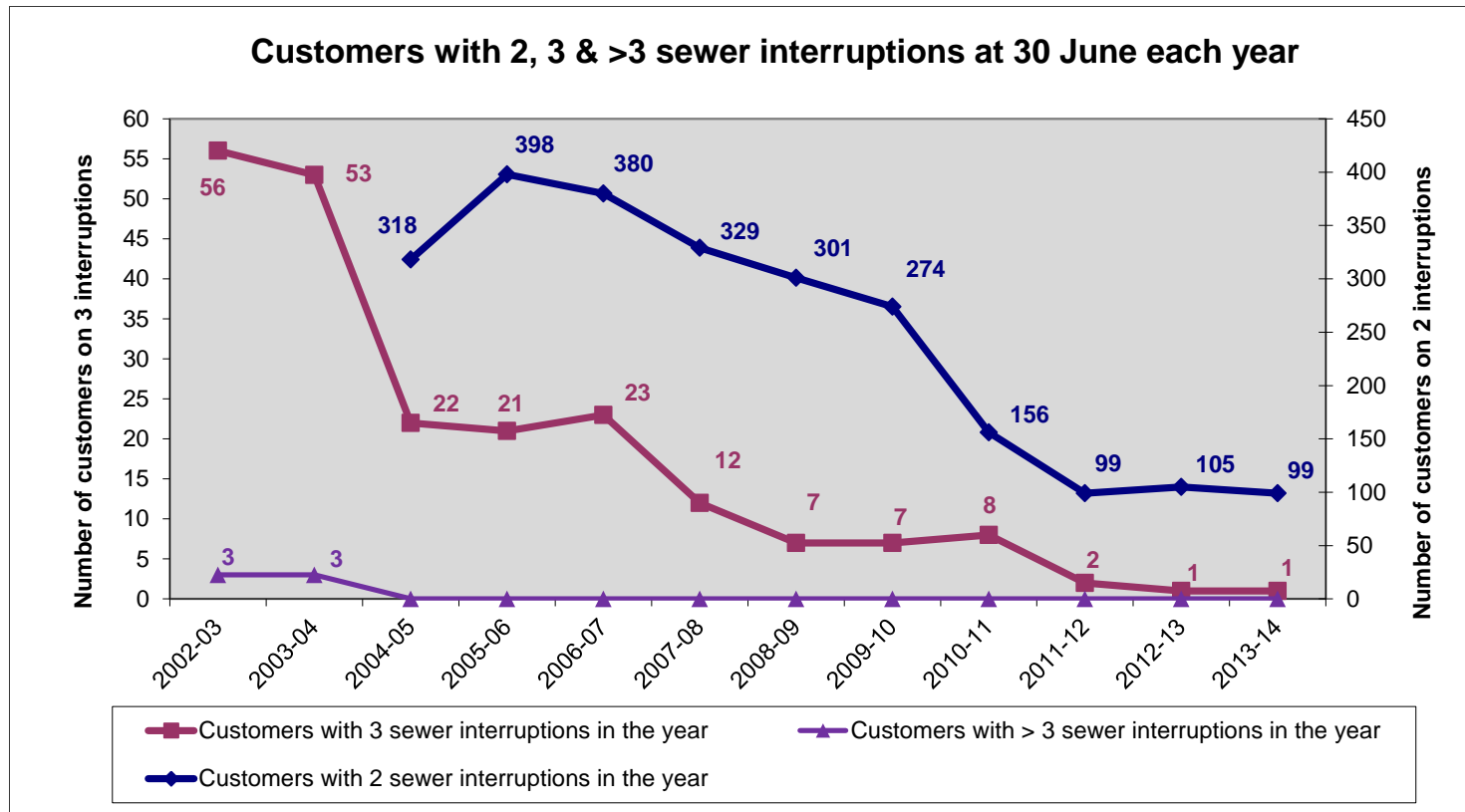
By the number of customers who lose water supply



Asset performance measurement

How do we monitor performance cont....?

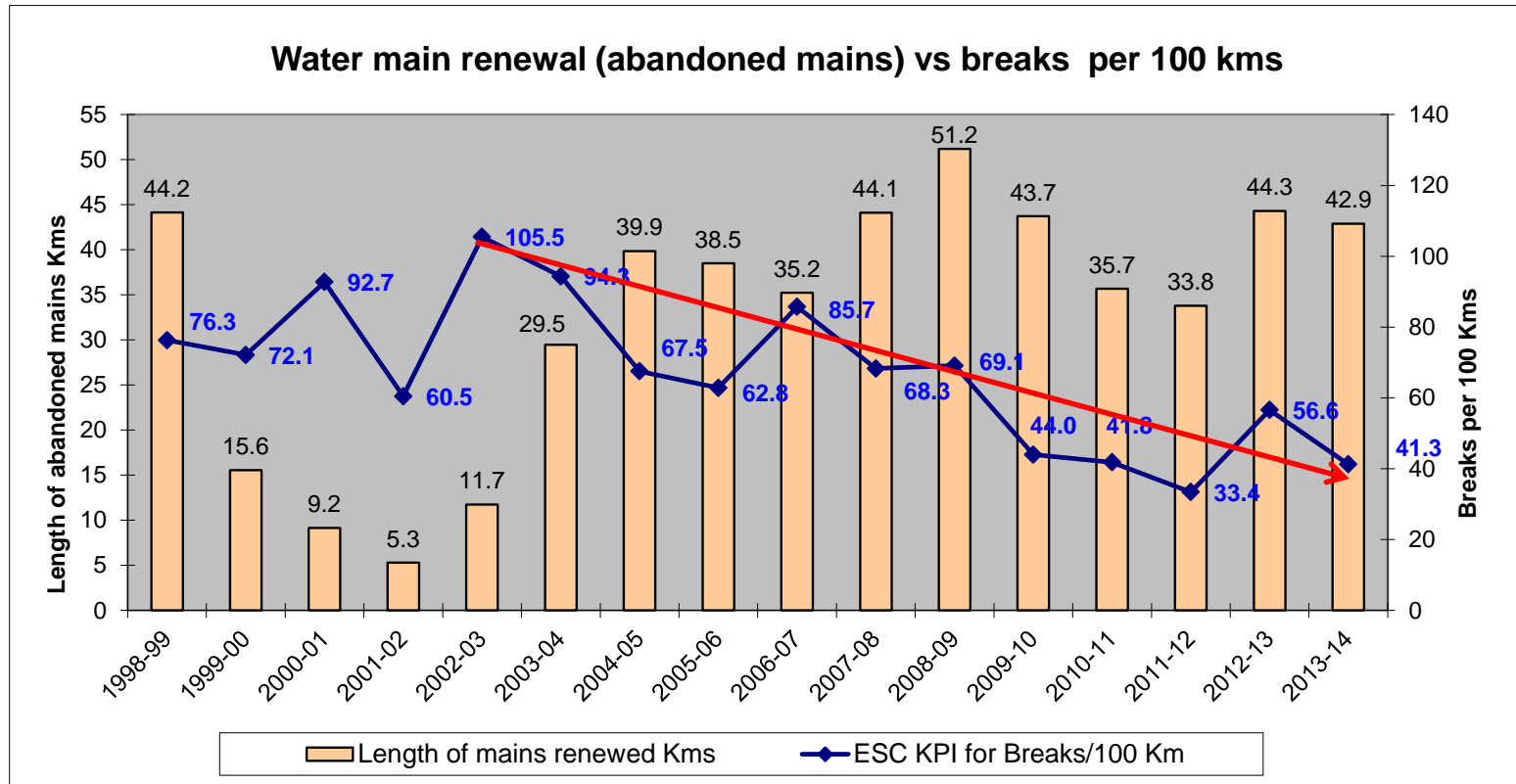
By the number of customers affected by repeat sewer blockages



Asset performance analysis

How do we analyse performance?

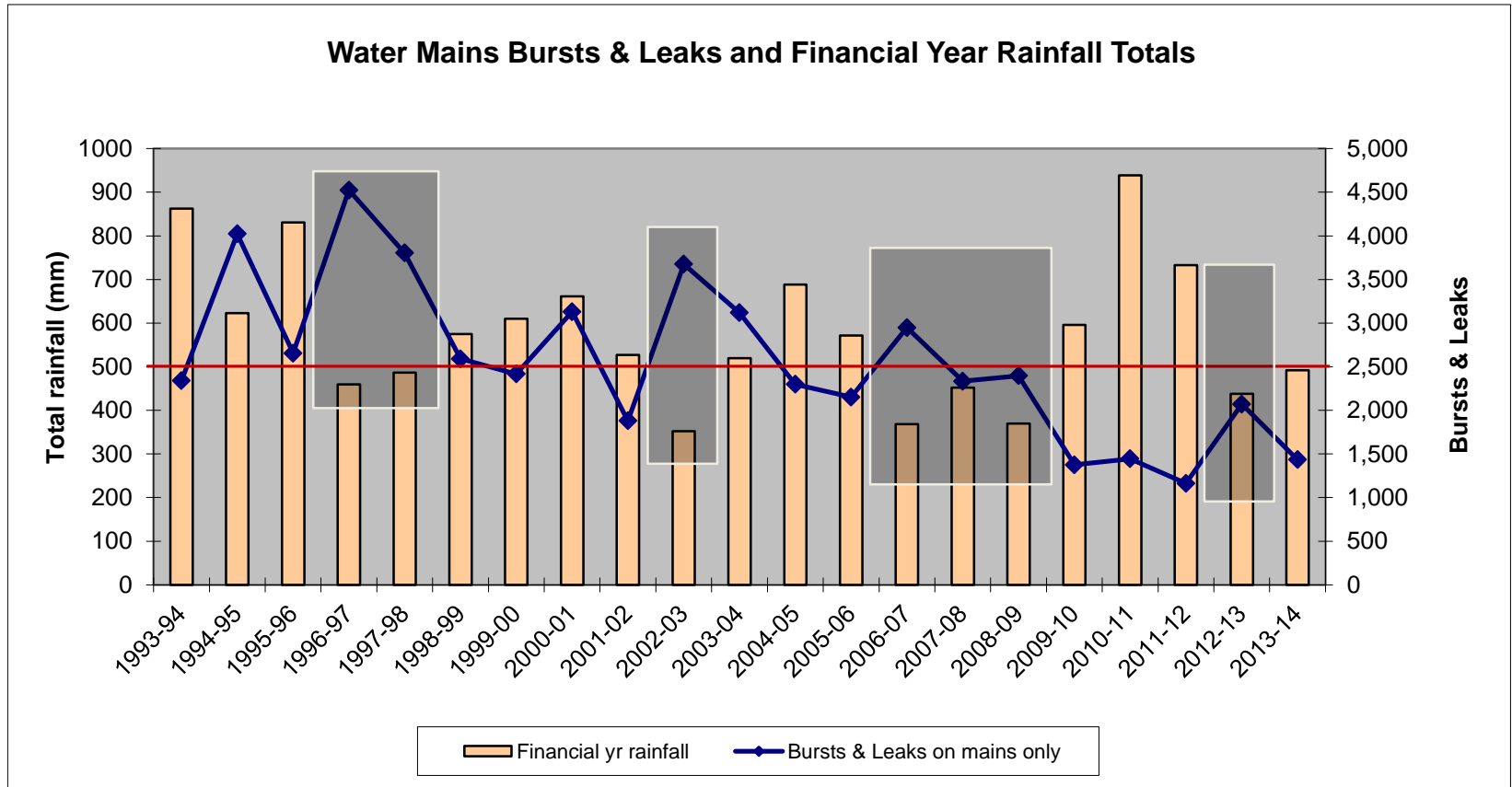
1. We assess the effectiveness of renewing water mains



Asset performance analysis

How do we analyse performance cont...?

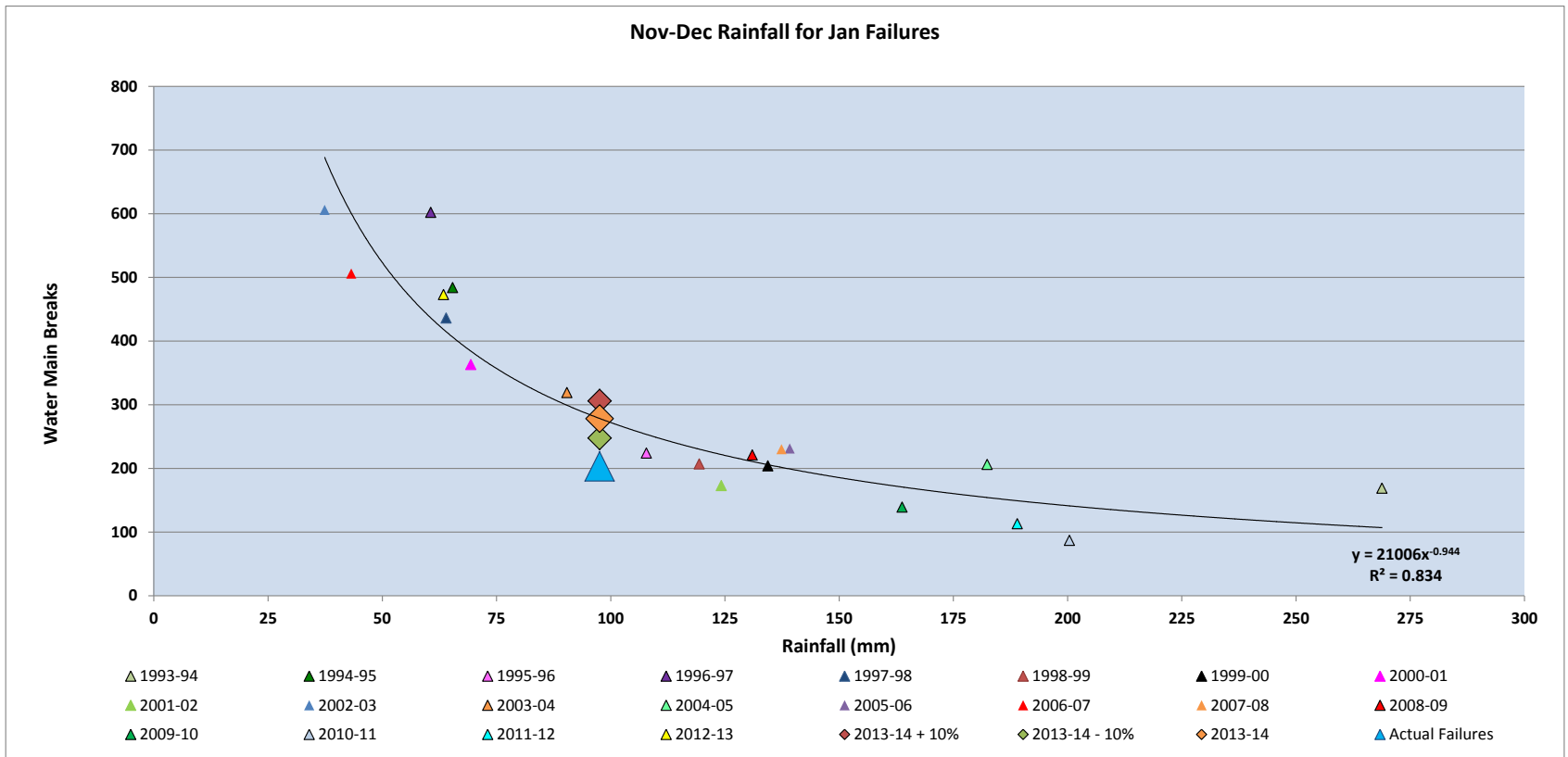
2. We also assess the effect of rainfall on failure numbers



Asset performance analysis

How do we analyse performance cont....?

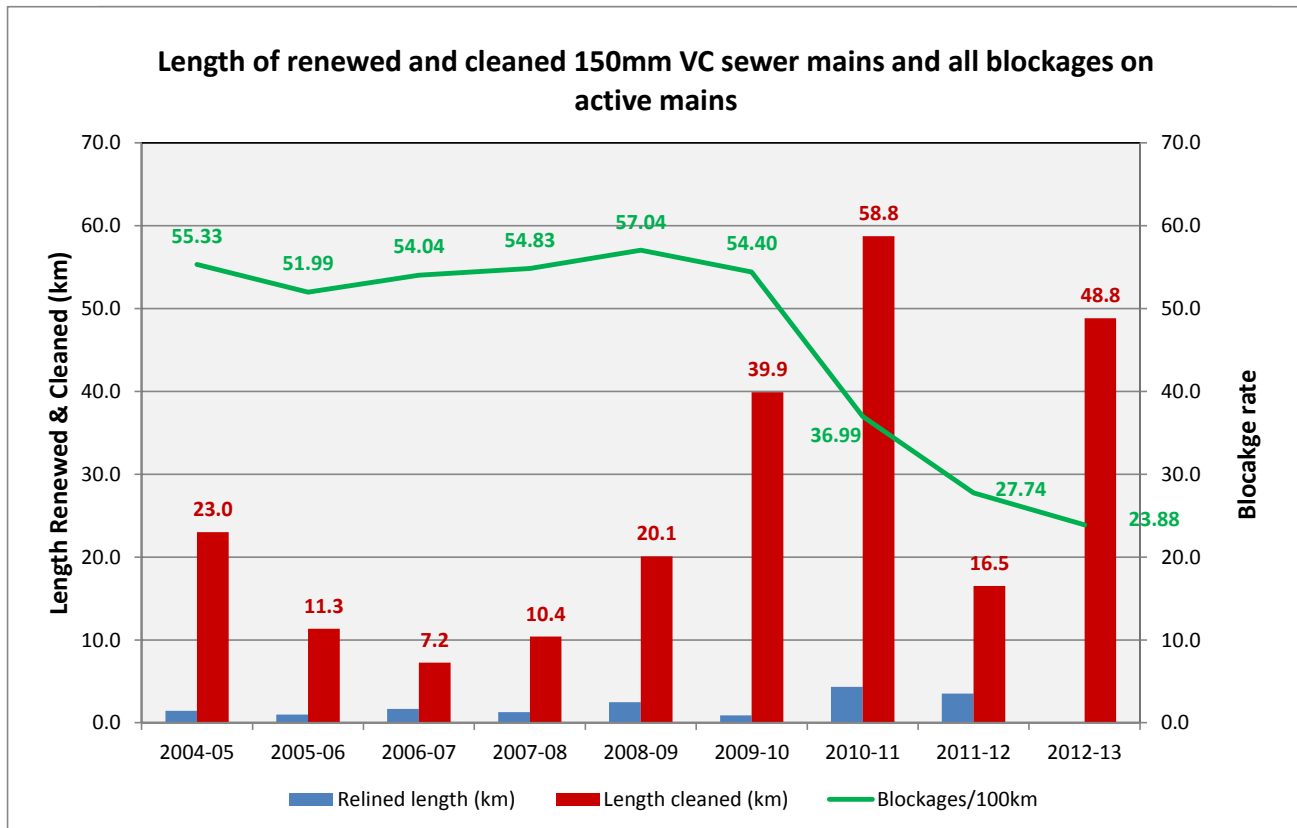
3. Simple tools now being used to predict failures



Asset performance analysis

How do we analyse performance?

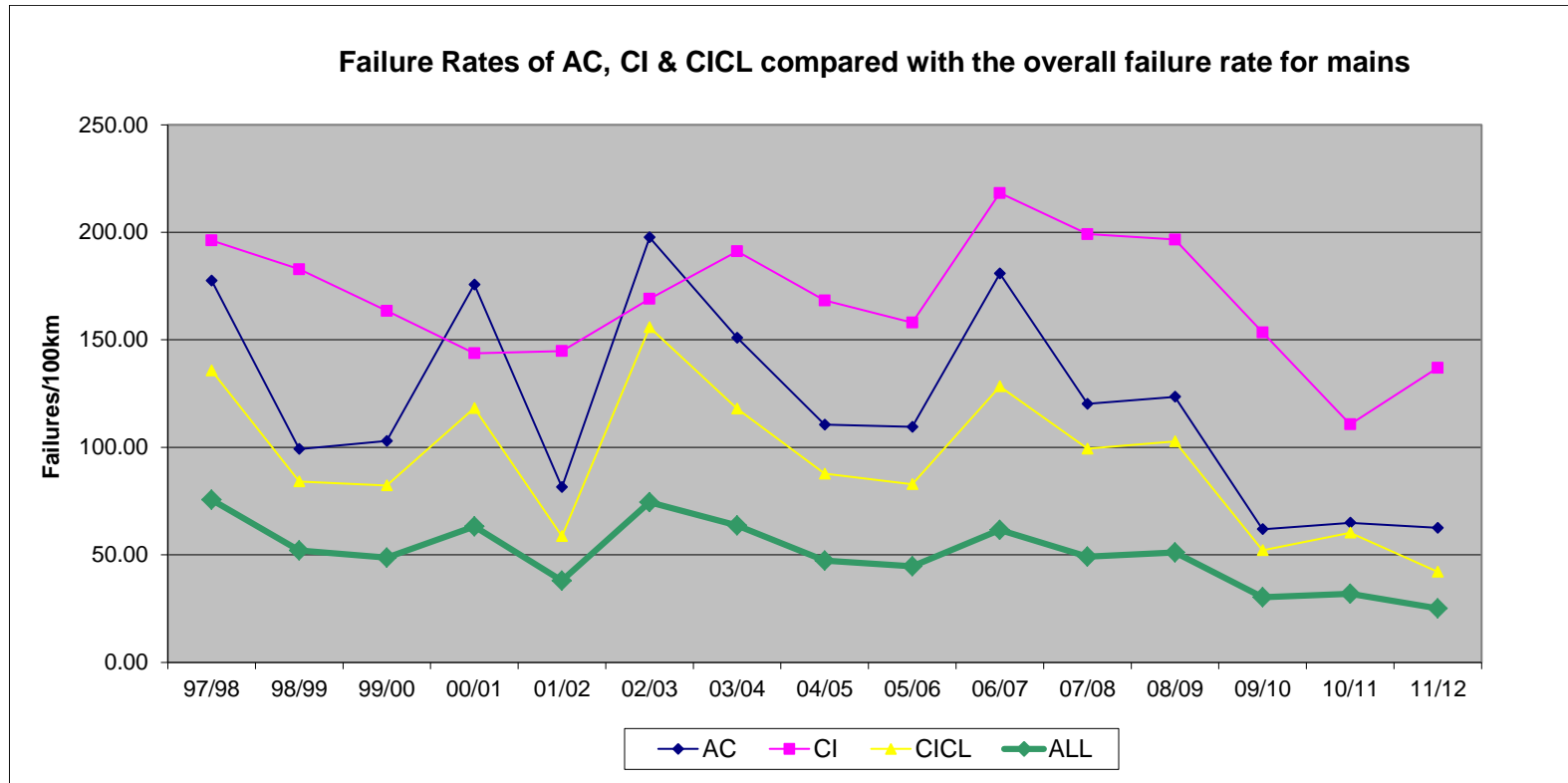
4. We assess the effectiveness of sewer cleaning on blockages



Asset performance analysis

How do we analyse performance cont....?

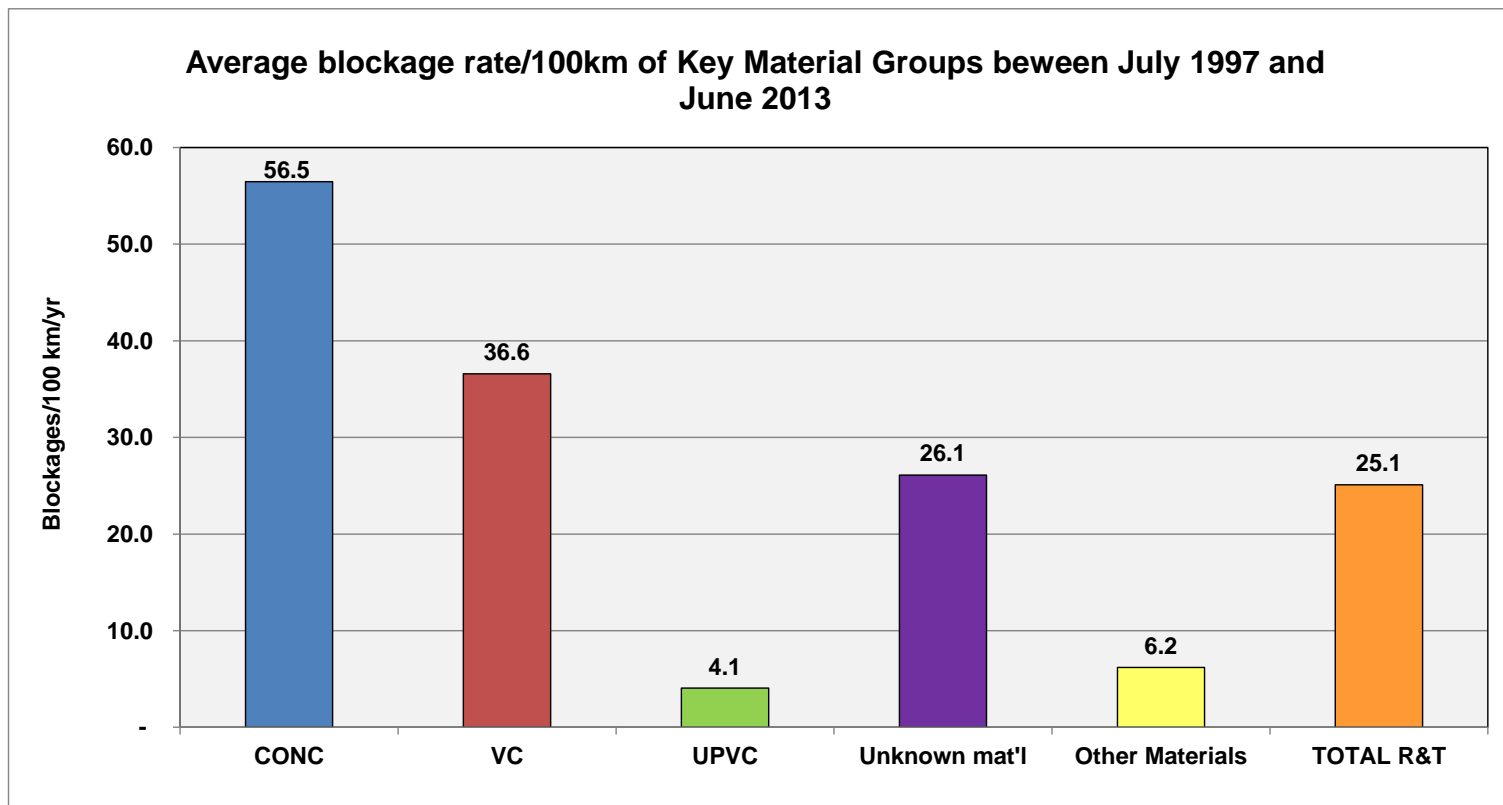
5. We also compare performance between pipeline materials



Asset performance analysis

How do we analyse performance cont....?

6. We also compare performance between sewer pipeline cohorts



Asset Management Field Work

- Condition monitoring
- Preventative maintenance
- Renewal
- Capacity upgrade to achieve hydraulic compliance



CWW's Condition Assessment Programs

Key programs - Water

- Assess condition of water mains
- Investigate asset corrosion of pipelines and structures i.e. tanks
- Customer water meter testing
- Inspection of fire services

Key programs - Sewer

- Assess condition of sewer mains
- Assess condition of other sewer ancillary assets eg. Vents & manholes
- Inspection of sewer rising mains



Pipeline Condition Assessment

Targeted to critical assets

- Assets with high consequence of failure
 - Water assets supplying critical customers (ie. hospitals, shopping centres)
 - Large metallic water mains
 - Water & sewer assets in inner city, major roadways
 - Transfer sewers adjacent to waterways



Asset Condition Assessment

Water main condition assessment tools

- Magnetic Flux Leakage (most commonly used at CWW)
- Sahara (previous trial – primarily a leak detection tool)
- P-CAT – Inverse Transit Analysis Technique (forthcoming trial)



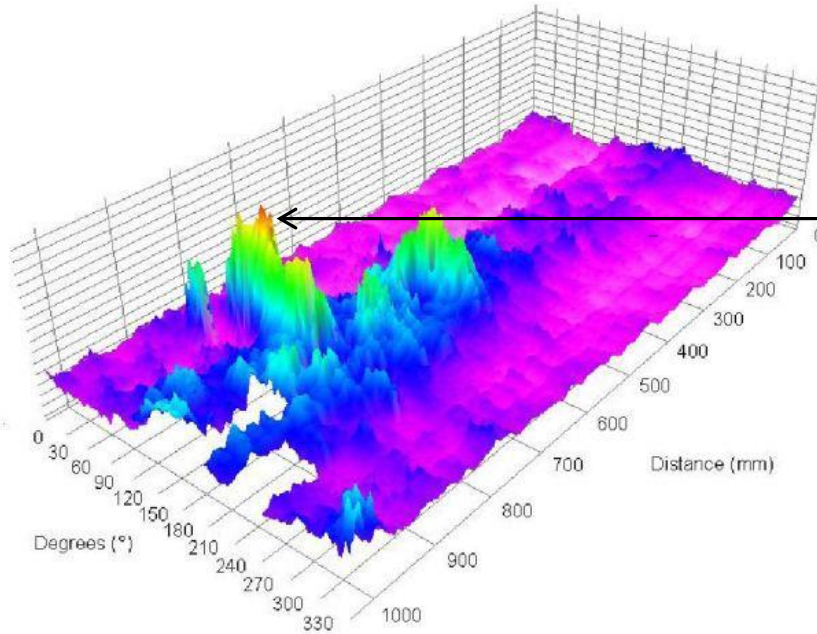
Asset Condition Assessment

Magnetic Flux Leakage – metallic water mains

- No shut down of main required
- Undertaken on a 1m length of main on full circumference
- Provides remaining wall thickness
- Joints cannot be scanned



3D SCAN PLOT



Defect Statistics

Orientation (degrees)	Axial Location (mm)	Depth (mm)	Diameter (mm)	Internal/External Defect	% wall thickness remaining
30	826	TWD	7	External	0
180	733	TWD	8	External	0
60	789	TWD	12	External	0
180	710	14.6	4	Internal	13
180	753	14.5	6	External	14
90	546	13.1	5	External	22
330	600	12.3	17	Internal	27
330	853	12.1	8	External	28
330	828	11.6	17	Internal	31
330	668	10.8	9	External	36

Magnetic Flux Leakage

Corrosion all the way through to cement lining



Ballarat Rd, Sunshine
(450mm MSCL 1926)

Asset Condition Assessment

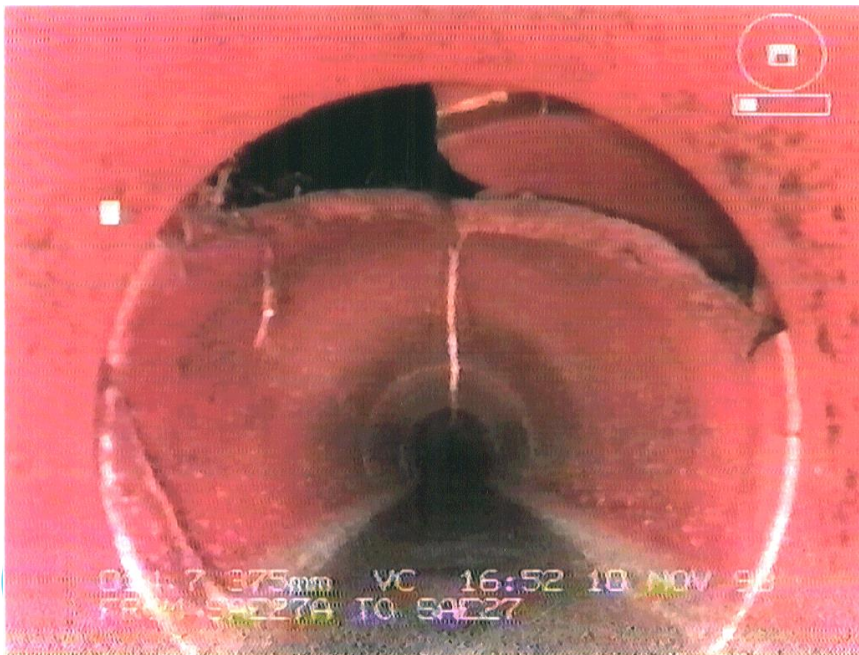
375mm main - 96 Waverley St Moonee Ponds



Asset Condition Assessment

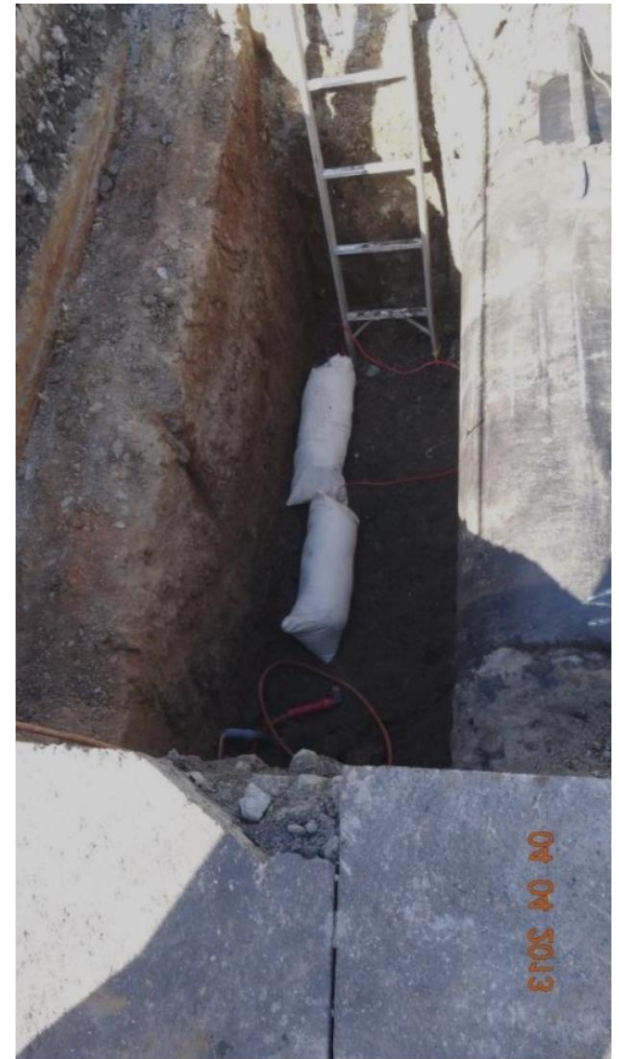
Sewer main condition assessment tools

- CCTV (most commonly used)
- MFL of metallic rising mains
- Smartball for rising mains – emerging technology



Preventative Maintenance Programs

Installation of cathodic protection (magnesium anodes) and test points on metallic water mains



Preventative Maintenance Programs

Installation of cathodic protection



Solar powered impressed current



Preventative Maintenance cont...

Hot shut-off block management

- Monitor customer interruptions
- 3 or more interruptions – (12 month cycle) start investigation
- Paint valves to inform operational staff
- For critical HSOB (awaiting renewal) – install temporary services



Preventative Maintenance Programs

Sewer cleaning

Sewer cleaning to remove tree roots



Debris removed from Dudley Street sewer



Preventative Maintenance Programs - Sewer



Combination Hydrovac Vehicle for Education, root cutting and jetting

Various water jet pressure cleaning heads



Water Asset Renewal Programs

- Manage risk
- Manage customer interruptions & long term asset performance (KPI attainment)
- Replace M&E assets at water sites eg. Tanks (Facility Renewals)
- Efficiency (or opportunistic) renewals
 - Council Road Works
 - Other Authority Works
 - Renewal at the time of repair (advanced deterioration)



Renewal works maintain performance and minimise risk



Asset Risk Management

- Assets identified for renewal based on risk
- Use of the Asset Risk Management Model (ARMM)
 - Tool used to calculate likelihood and consequence of failure of assets
 - Systematic approach to assessing the complete network



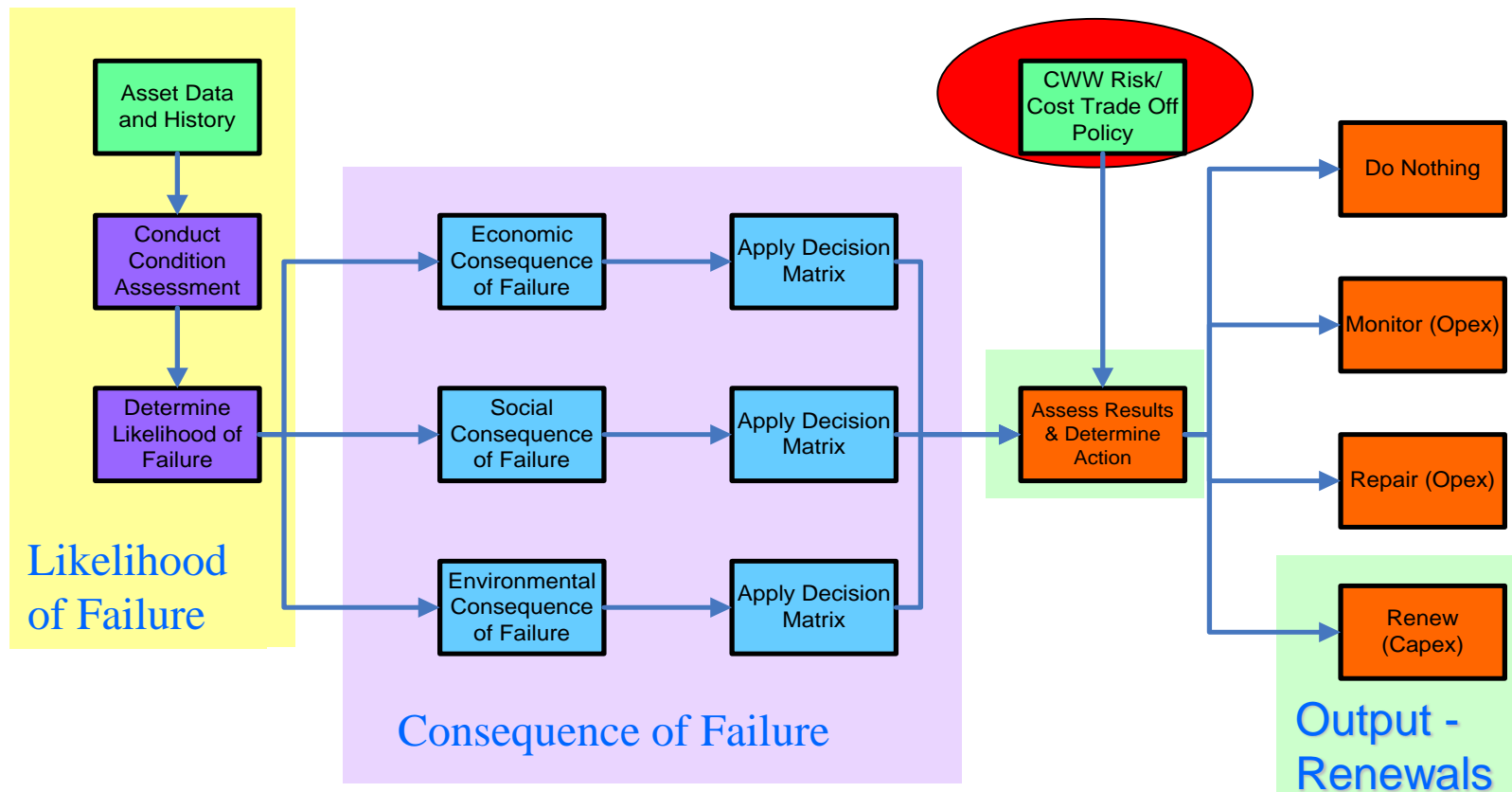
Assessment of Risk

Risk threshold adopted by CWW Board

Likelihood of Failure	Economic or Social or Environmental Consequence of Failure				
	Insignificant	Minor	Moderate	Major	Catastrophic
5	Low	Moderate	High	Extreme	Extreme
4	Low	Low	Moderate	High	Extreme
3	Negligible	Negligible	Low	Moderate	High
2	Negligible	Negligible	Negligible	Low	Moderate
1	Negligible	Negligible	Negligible	Negligible	Low



How does the risk model Work?



Water supply hydraulic compliance

- To manage areas with low pressure & flow
- Compliance to levels of service
- To provide adequate fire fighting flows
- Identified as an issue with the remaining unlined cast iron mains
- Urban redevelopment can increase demand beyond design flows



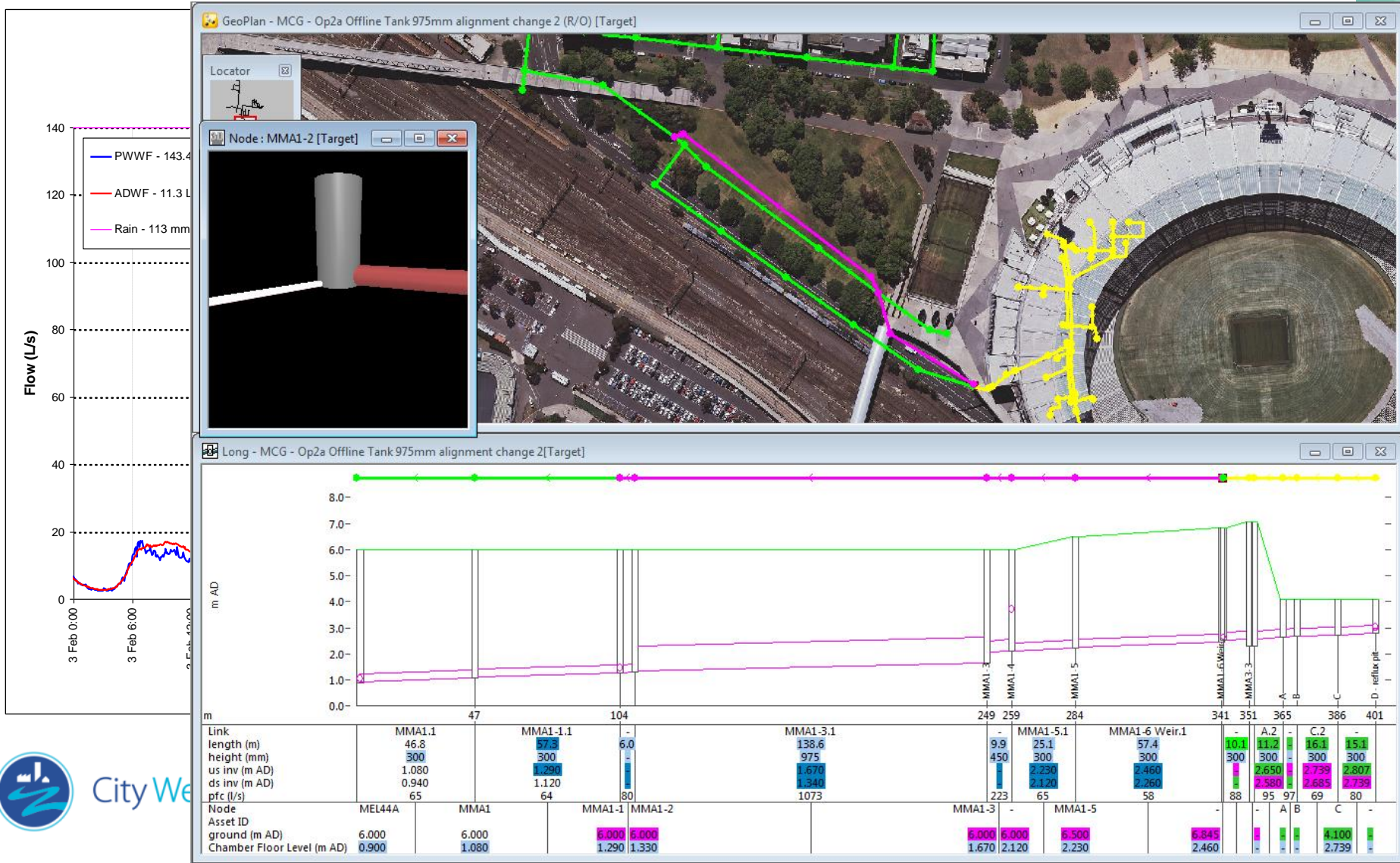
Sewerage system hydraulic compliance



Sewerage pipelines overloaded



Sewer hydraulic modelling develops compliance works



Knowledge management supports budgeting

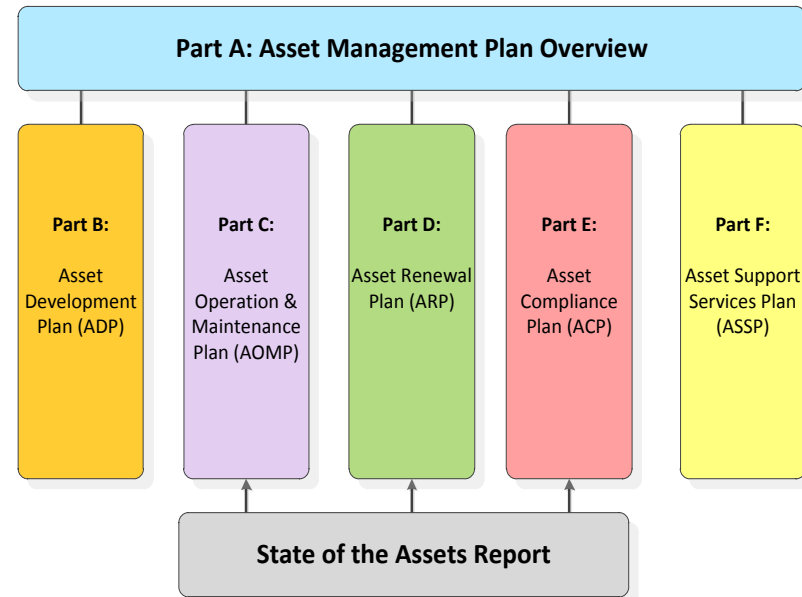


State of the Assets Report 2012

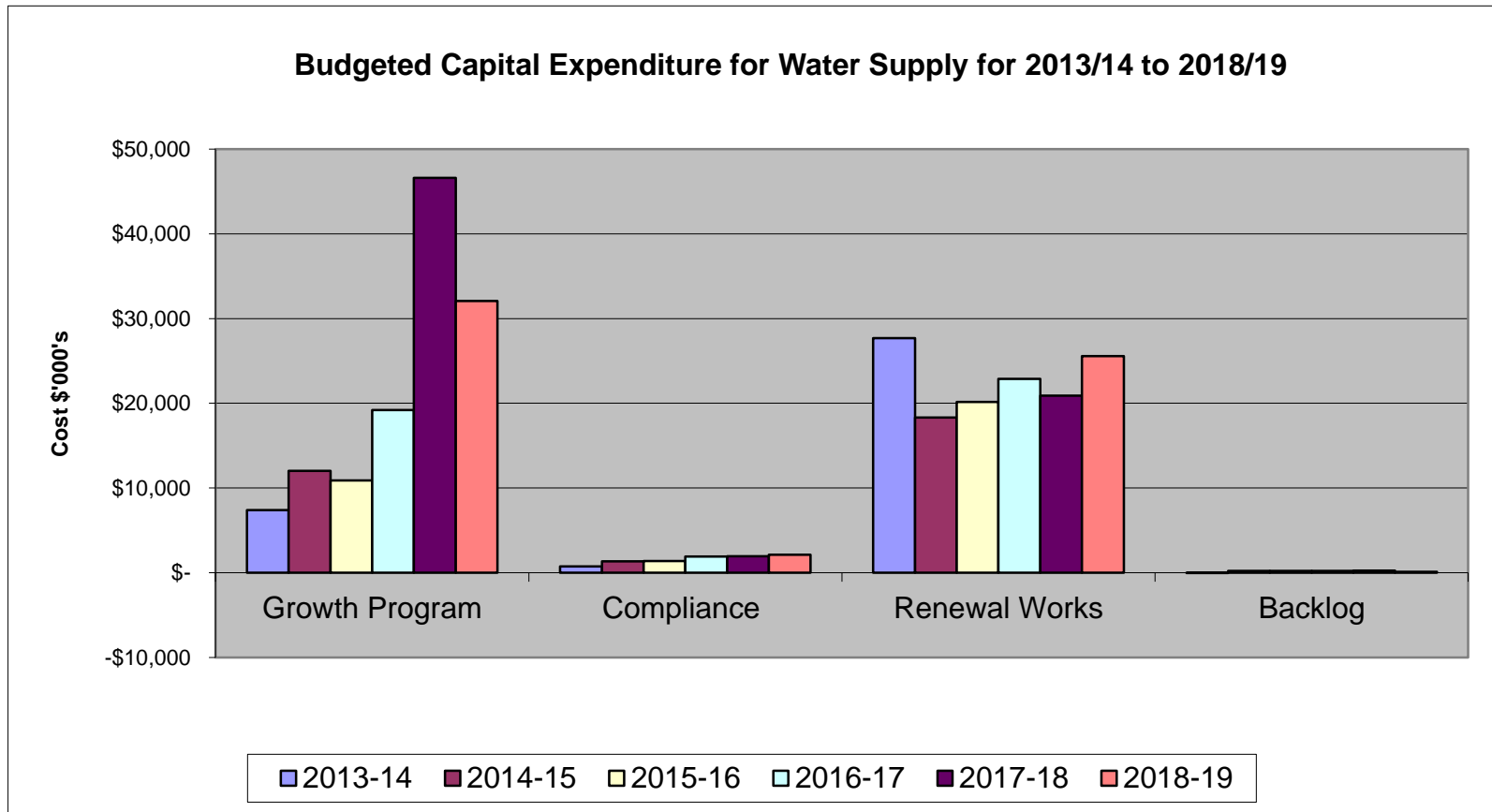
City West Water



State of the Assets Report 2012
City West Water



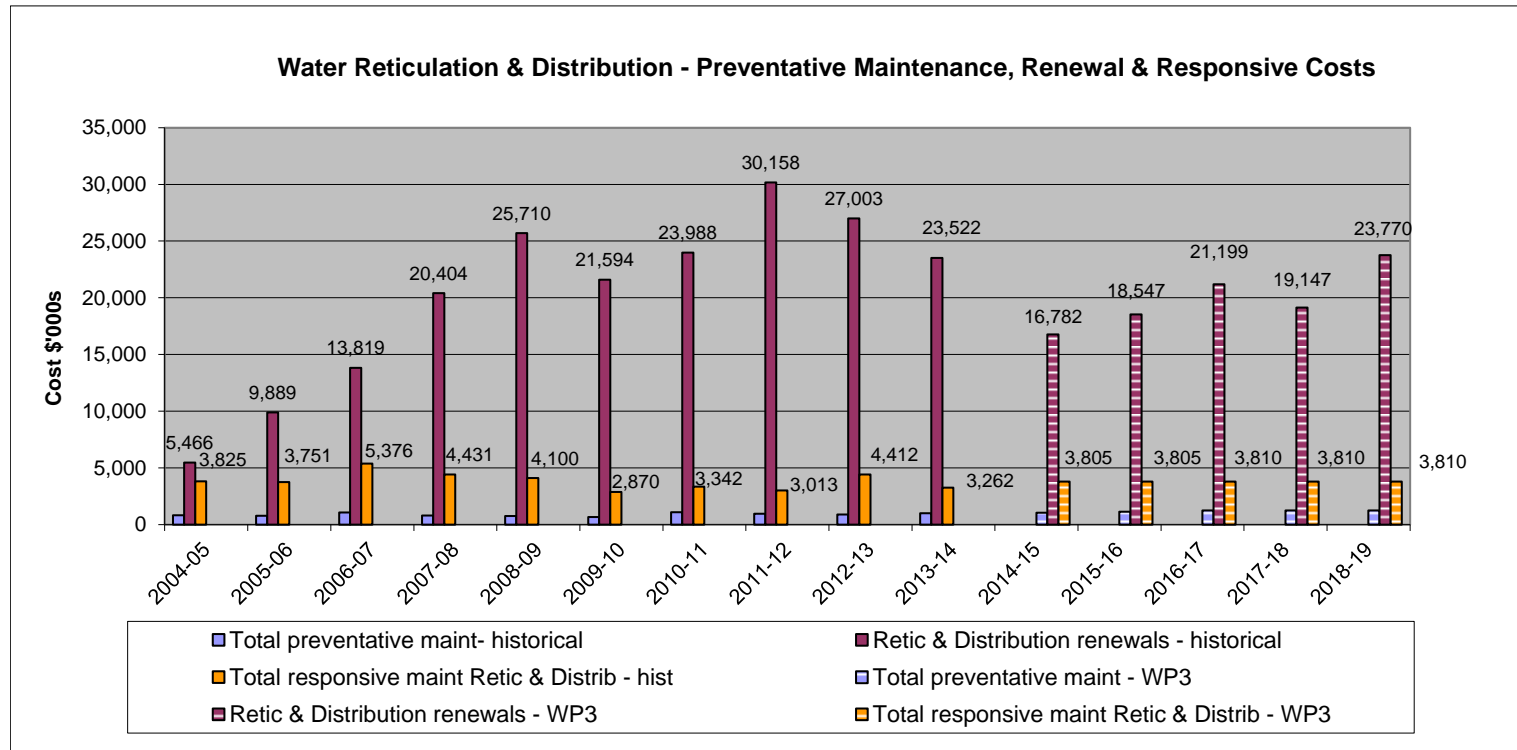
Asset Management Plan documents the program budgets



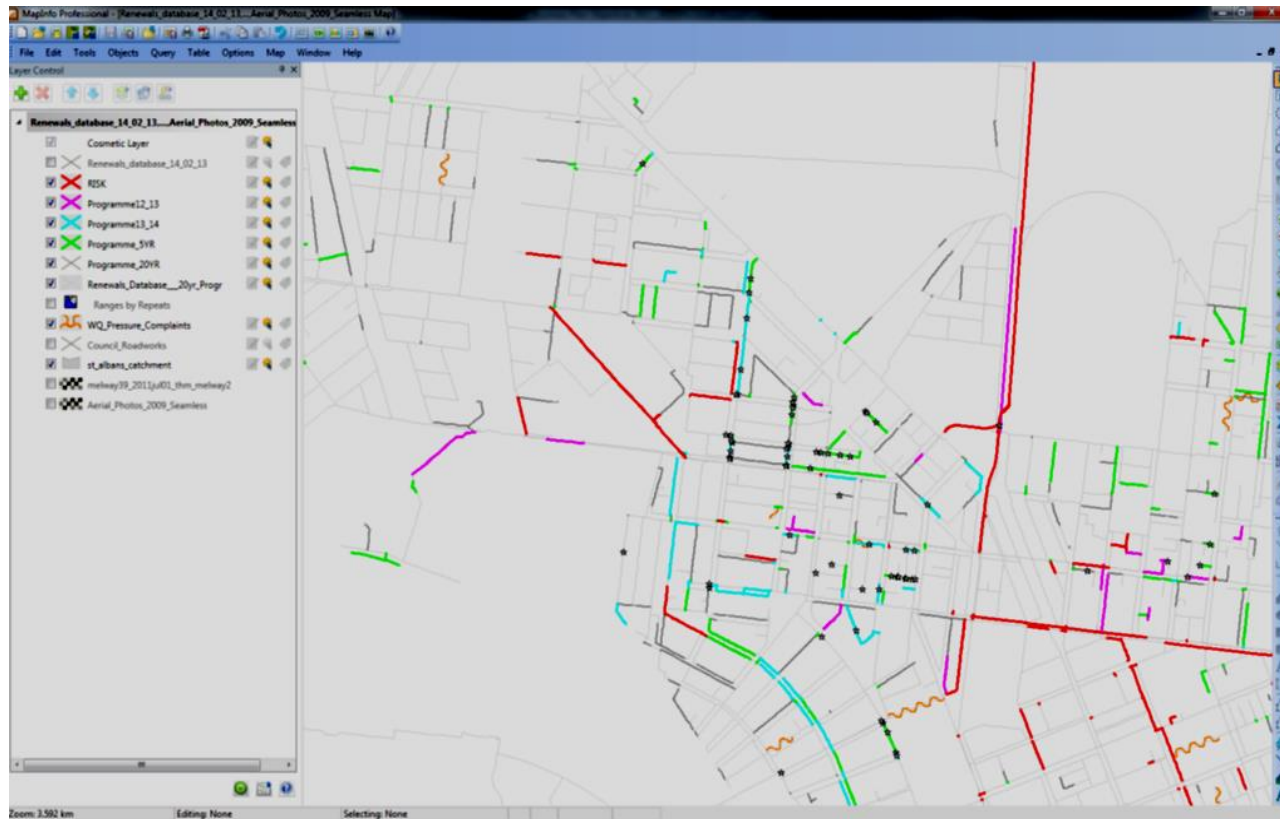
State of Assets documents expenditure and performance

How do we monitor expenditure?

We record responsive, preventative and renewal costs



Information management delivers efficiency



Proposed 10 year works programs – all renewal programs
Prevents duplication and assists co-ordination of works



Asset performance management

Summary of what is required to undertake asset management?

- Good knowledge of asset details, asset performance and asset performance targets
- A good GIS to record asset changes
- Resources to analyse performance
- Financial reporting at the asset class level i.e. water pipelines
- Asset management documentation eg. State of Assets Report

