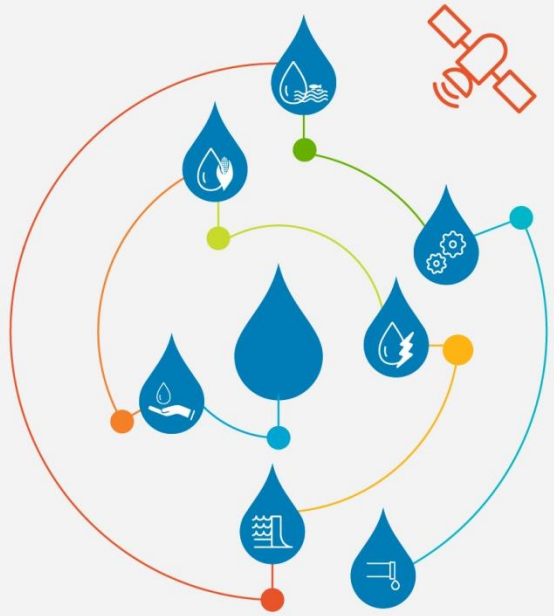
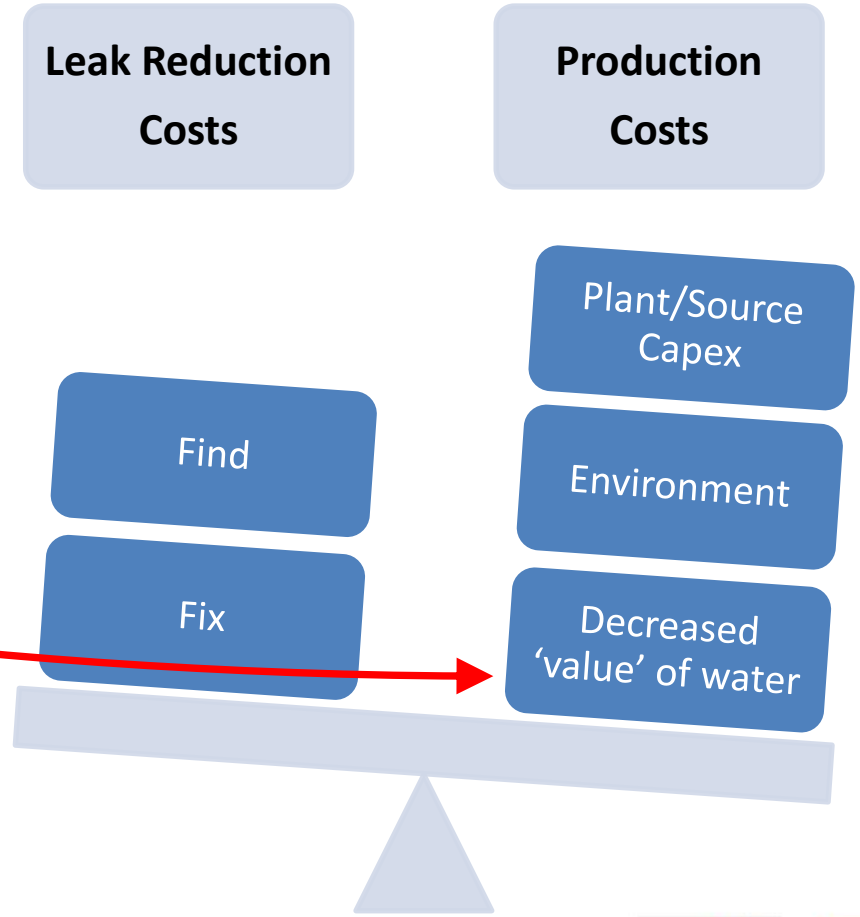
Increasing Water Supply by Reducing Losses



Toby Bourke
Innovyze
2nd of October, 2018

Leakage Reduction vs Water Production

"Reducing water losses is critical to efficient resource utilisation, efficient utility management, enhanced customer satisfaction, and postponement of capital-intensive additions to capacity…In fact the ***costs of improved service delivery are much lower when undertaken through the investments in NRW rather than through investments in capital projects to augment supply capacities***"
Arjun Thapan, ADB



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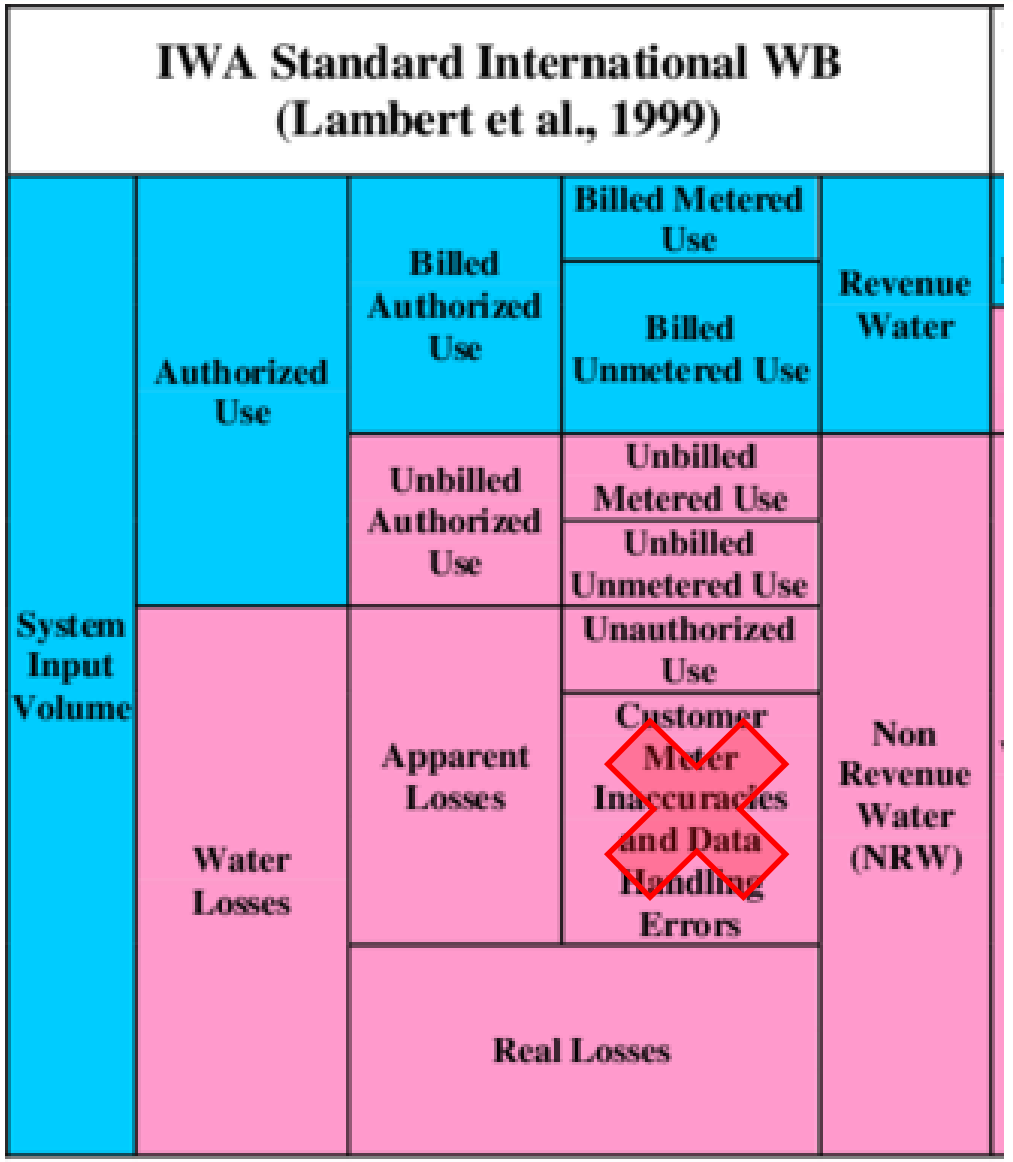
NRW and ILI

- IWA's Infrastructure Leakage Index (ILI) method addresses most components of Non-Revenue Water (NRW)



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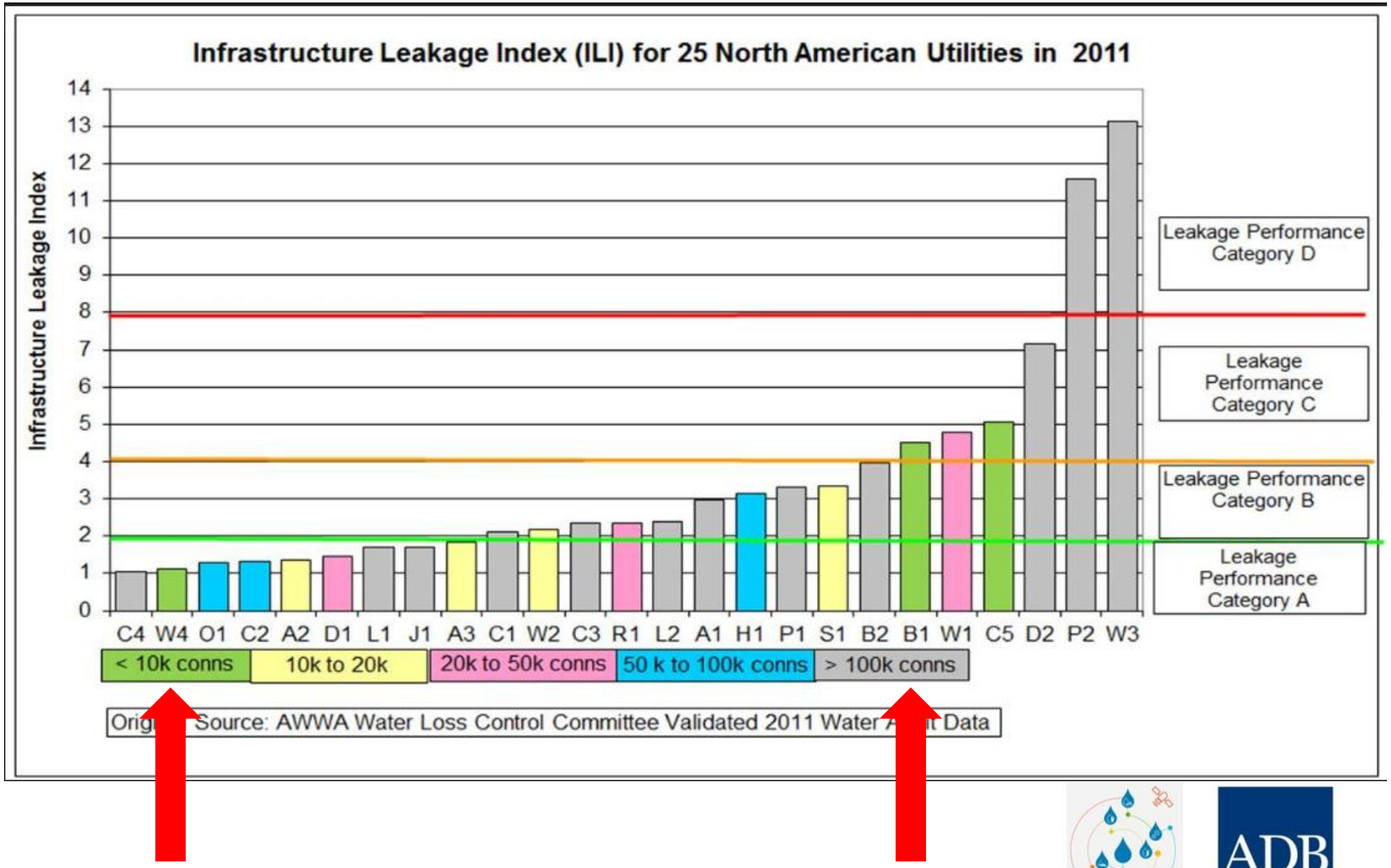
ILI: Intended application

- Uniform benchmark of utilities with varying attributes
- **CARL/UARL**
- Small and large populations OK



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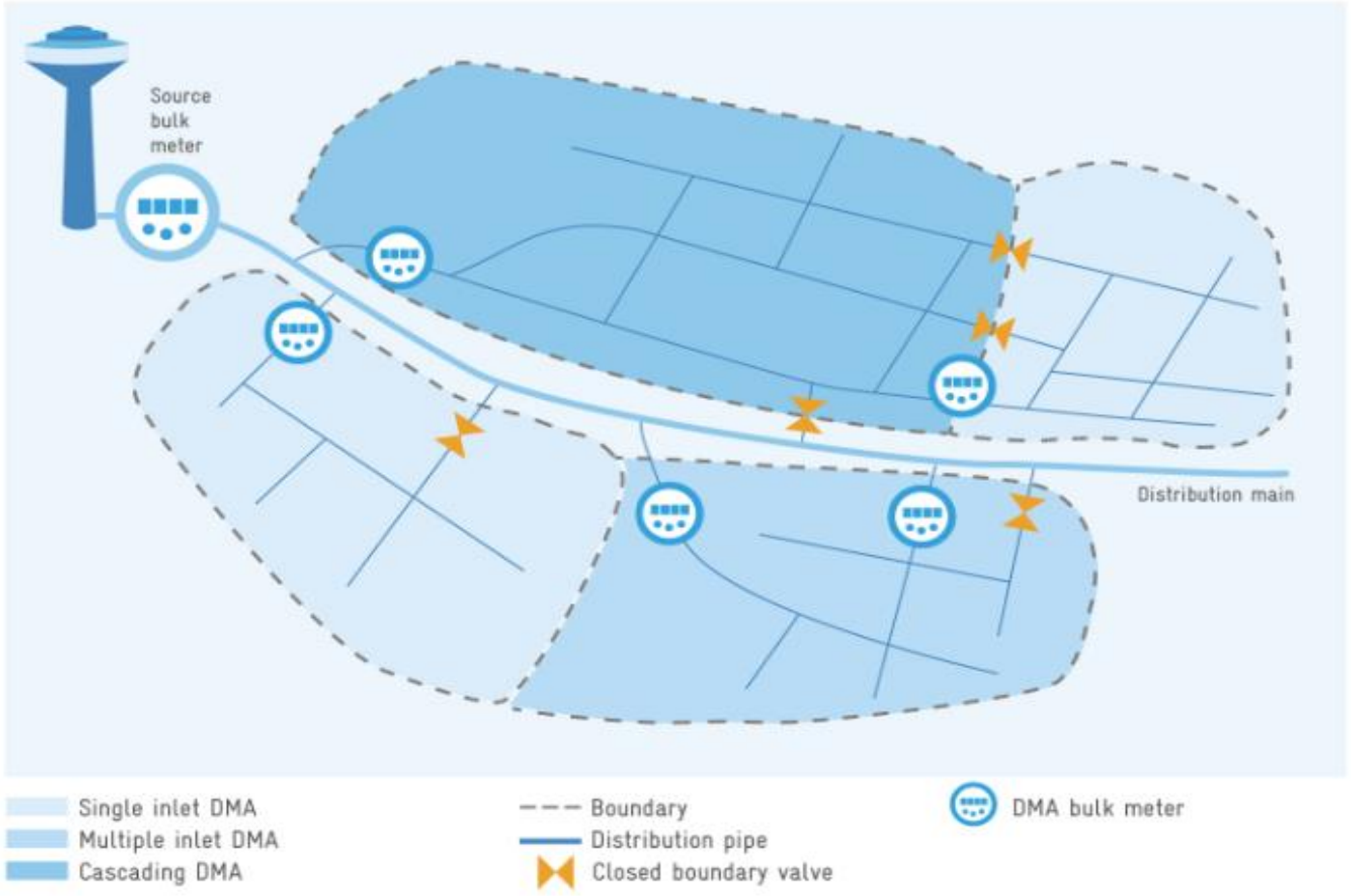
District Metered Areas as ILI Calculation Units

- Insightful variation
  - Pressures
  - Demographics
    - Demand
    - Theft / unmetered use
  - Construction, age and rehab

- Localisation and location activity **prioritised** by DMA



References:

[22] Farley, M., Leakage Management and Control. WHO, 2001.

[58] Morrison, J., Tooms, S. and Rogers, D., District Metered Areas Guidance Notes. IWA Publishing, London, United Kingdom, 2007.

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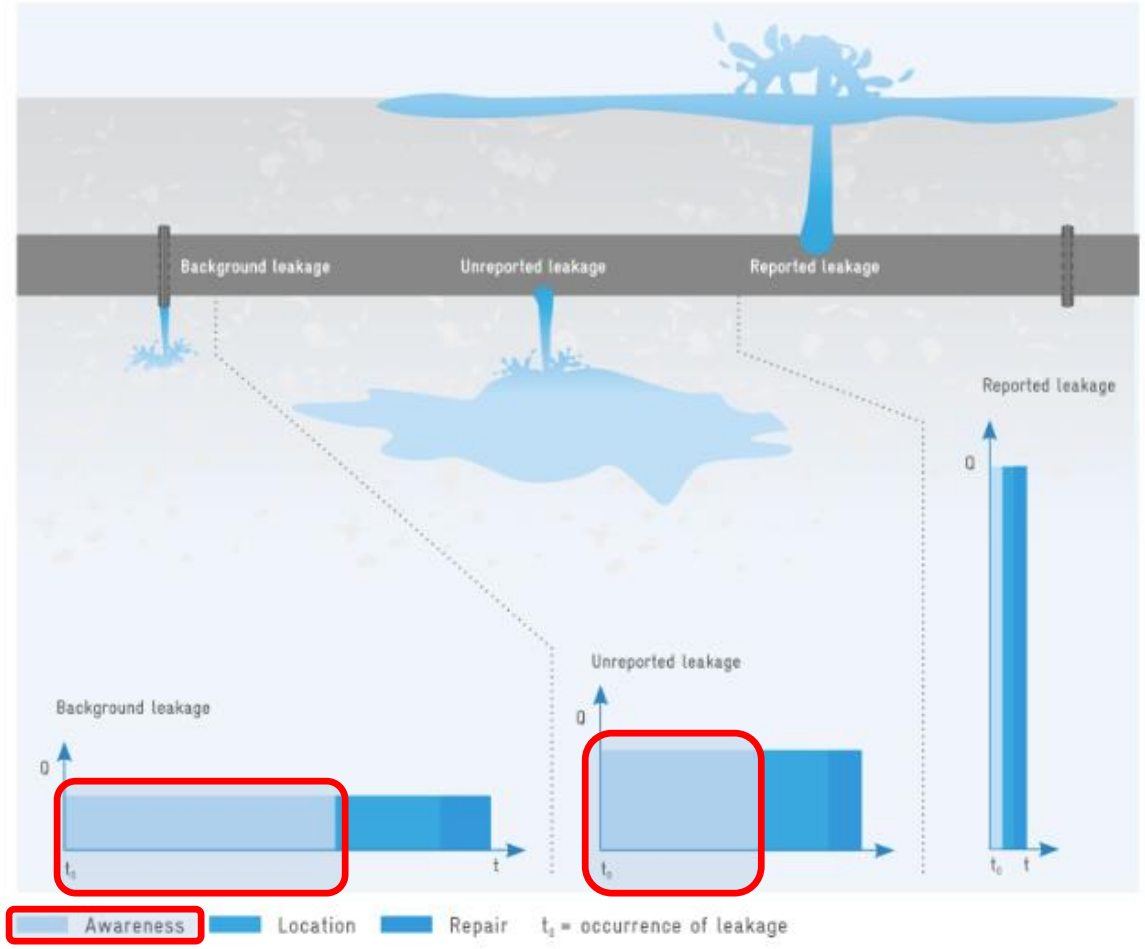
How: Reduce Time to Awareness

- Highest leaked volume during ‘undetected’ phase leakage incident
- Solution: ‘Detect’ more often!
- ILI becomes **CRL/URL**



References:

[22] Farley, M., Leakage Management and Control. WHO, 2001.

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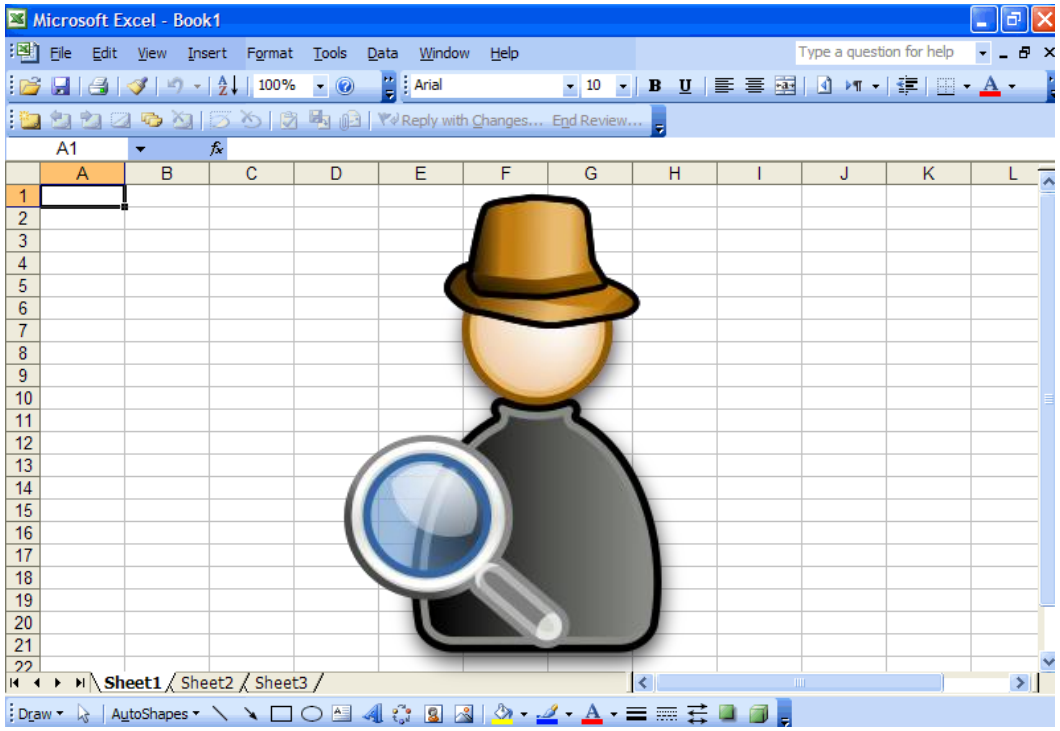
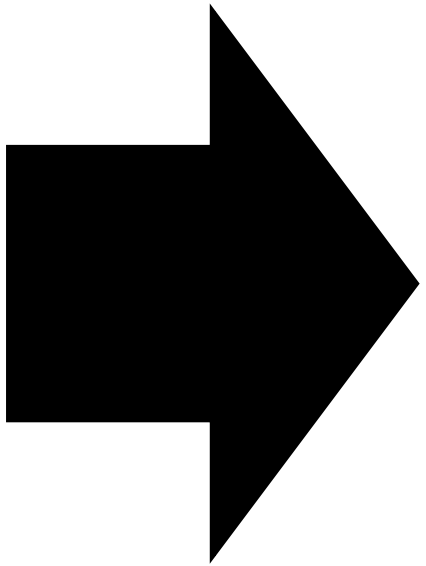
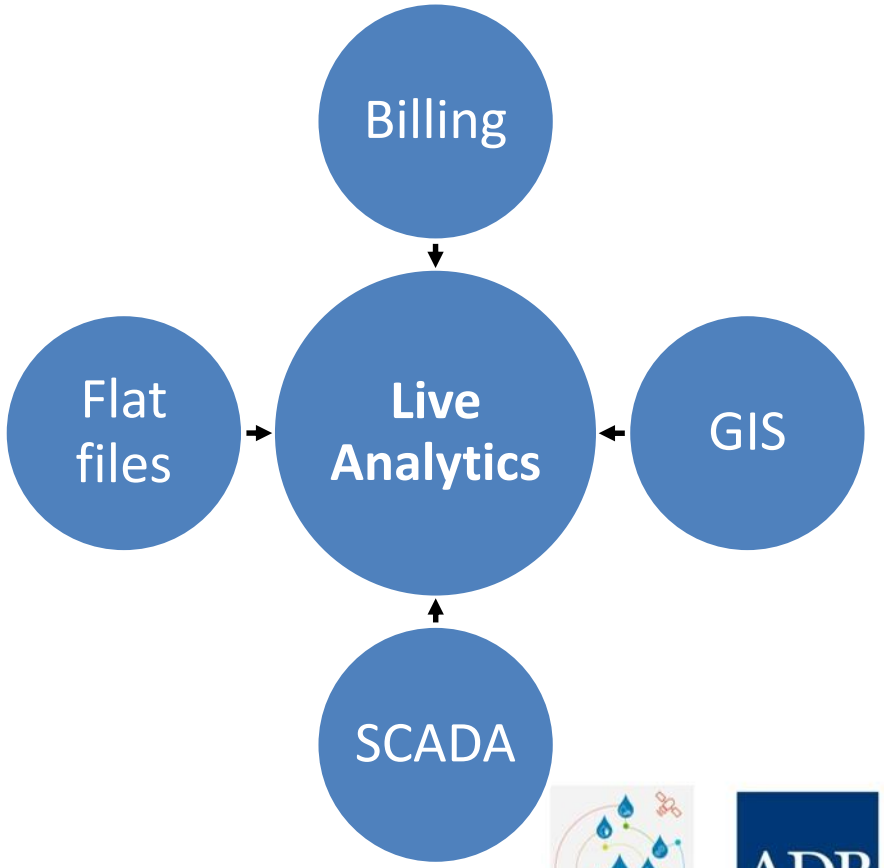
Innovative Enablement: Live analytics software

One annual utility ILI report becomes hundreds of daily DMA ILI reports







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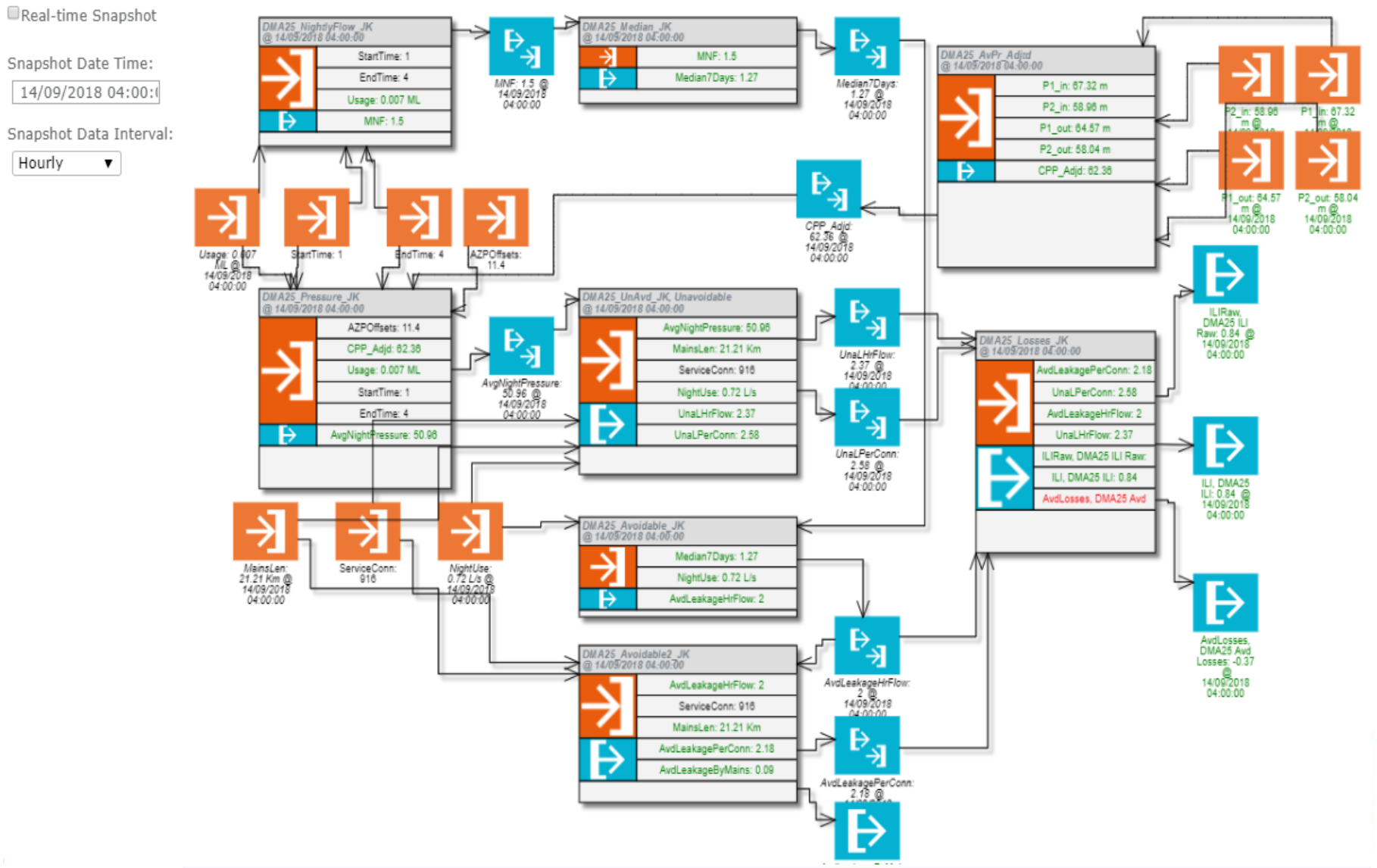
Case Study: Logan City Council, Australia

- Data types
  - Flat file
  - Constants
  - GIS
  - SCADA
  - Billing
- Daily result @ 4am



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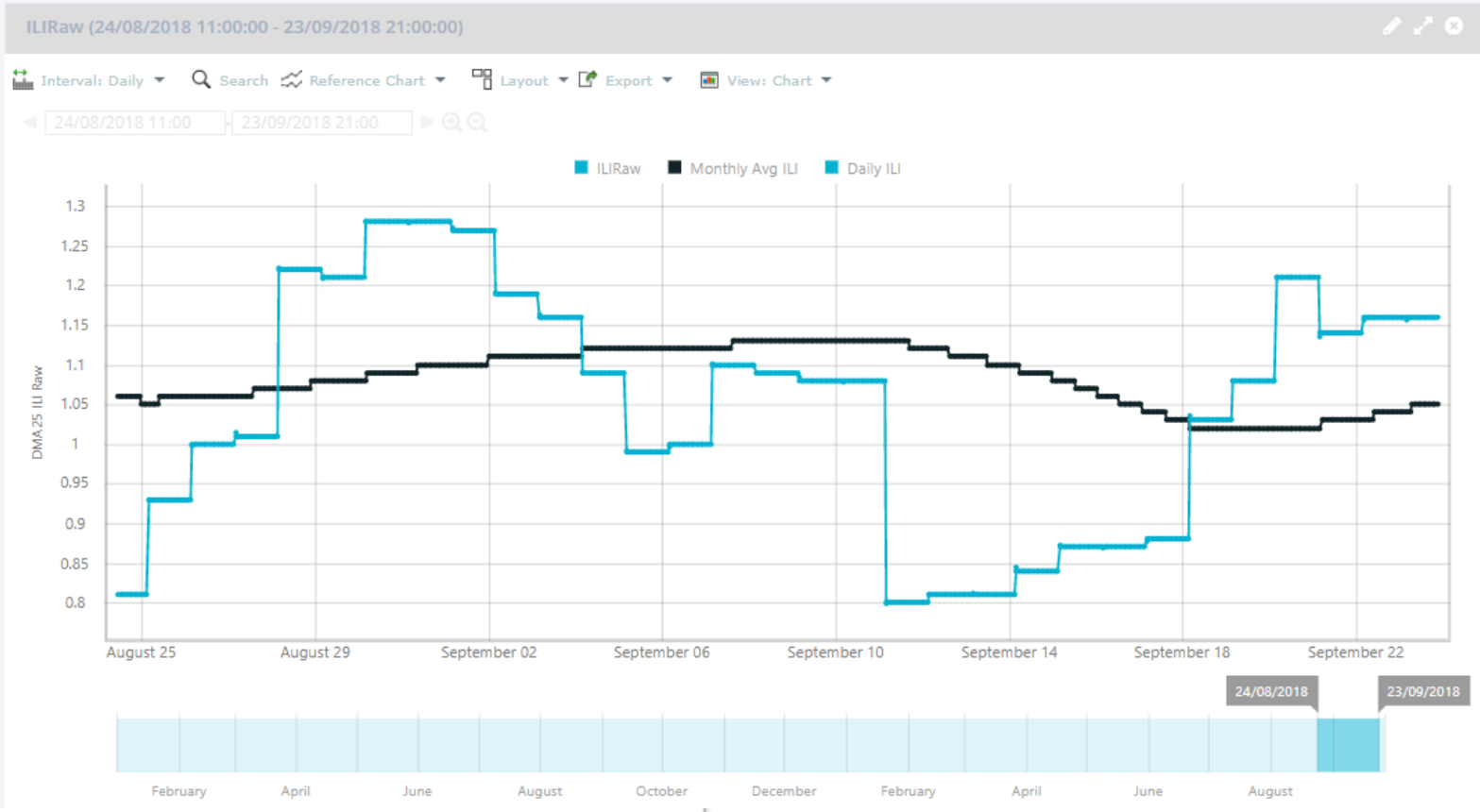
Case Study: Logan City Council, Australia

- Daily and monthly averaged ILI per DMA
- Report of 88 DMAs ranked by ILI



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SCADAWatch ILI Report

Daily Water DMA Leakage - North

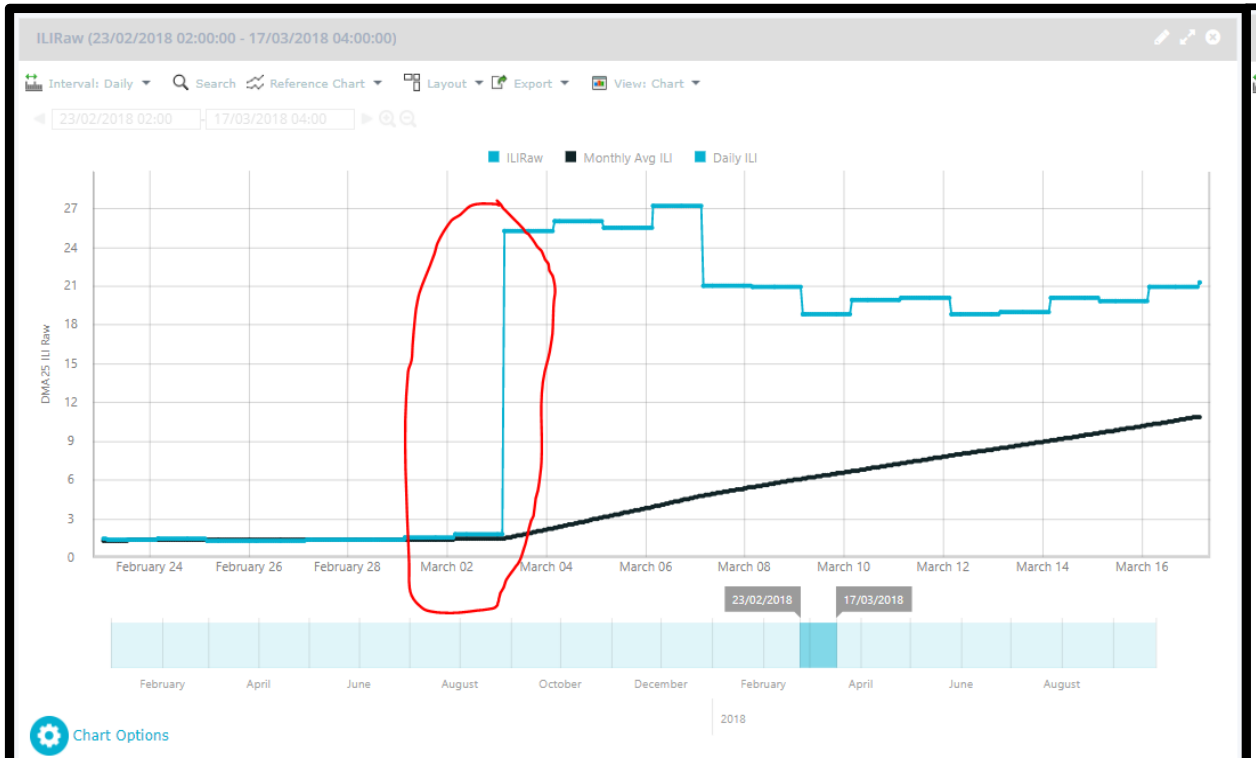
Report Generate at: Jul 28, 2018 05:08:43

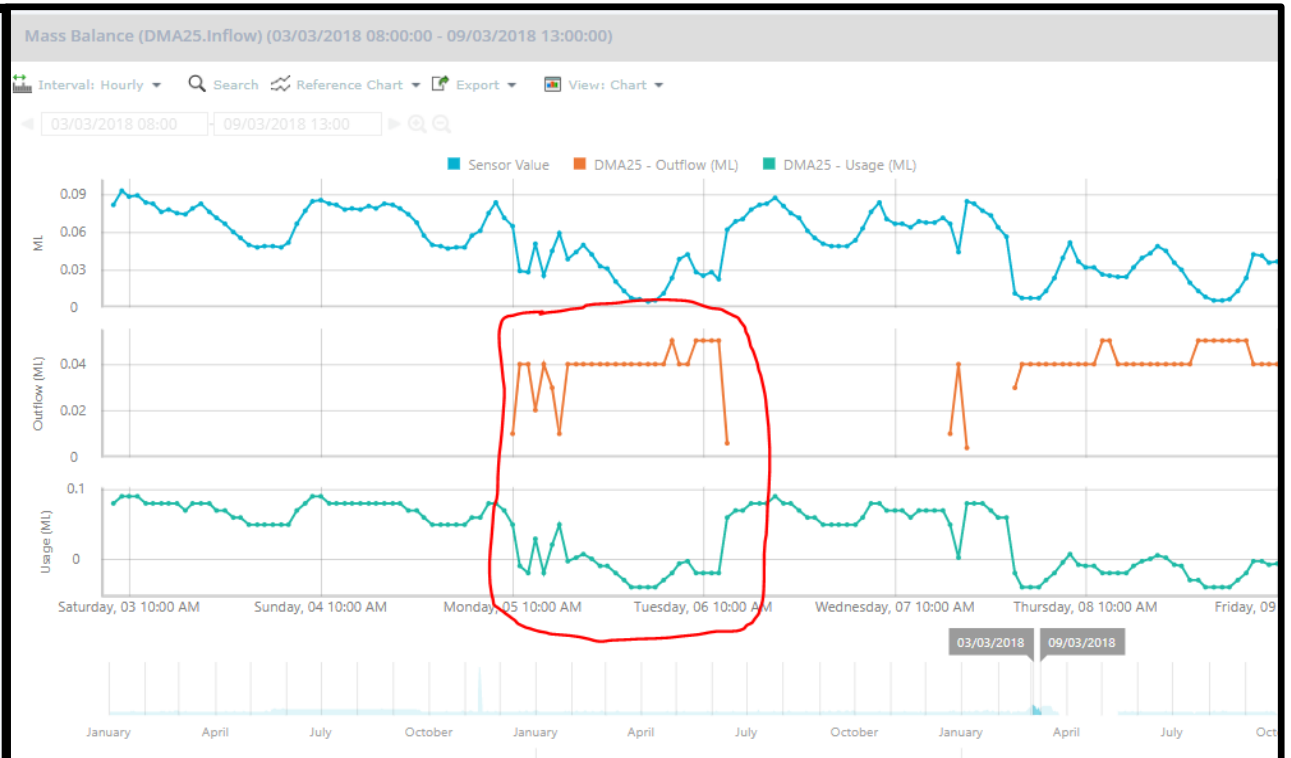
Values are for Date: Aug 10, 2017

	Asset & Demographic Information				Asset & Demographic Information			Unavoidable		Utility Night Leakage				
DMA Site	Mains Length (km)	Service Conn.	Est'd Popln	Legit Nightly Flow (L/s)	Avg. Night Pressure (m)	Minimum Night Flow (L/s)	7 Day Median Night Flow (L/s)	Hourly Flow (kL/h)	Per Conn. (L/conn/h)	Hourly Flow (kL/h)	Per Conn. (L/conn/h)	by mains (kL/km/h)	Snapshot of ILI	Avoidable Losses (L/s)
DMA25	21.21	912		0.8	58.2	0.5	0.6	2.7	3.0	-0.6	-0.7	0.0	0.0	-3.3
DMA20	71.5	3173		4.2	46.0	8.8	9.3	7.3	2.3	18.2	5.7	0.3	2.5	10.9

Indirect benefit – DMA Zone breach detected

- 3 March, 2018: ILI increases by 2000%
- DMA outflow higher than inflow = Water must be entering DMA through an unmetered valve





Applicability to Asia

- Nature of ILI is regionally/demographically agnostic
- Good fidelity of SCADA and GIS in major Asian cities
- DMA establishment methodology free and well defined by IWA
- Web browser interface, cloud or local server hosted

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Conclusions

1. Leakage reduction, not capacity production
2. Time to awareness reduced by live monitoring
3. Objectivity of ILI at network level translates well to DMA prioritisation
4. Pre-processing of data for simple ILI tools prevents live approach
5. Sub-DMA leak localisation and location efforts can be rapidly redeployed as priority hierarchy amongst DMAs changes
6. Indirect benefits of burst detection and DMA integrity management

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Acknowledgements

- Jeremy Thomas – Logan Water Infrastructure Alliance
- Hayden Knight – Stantec, Australia

- Note: Logan City Council was already performing sub-annual, DMA ILI calculations in spreadsheets before SCADAWatch by Innovyze trailed for the task successfully

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