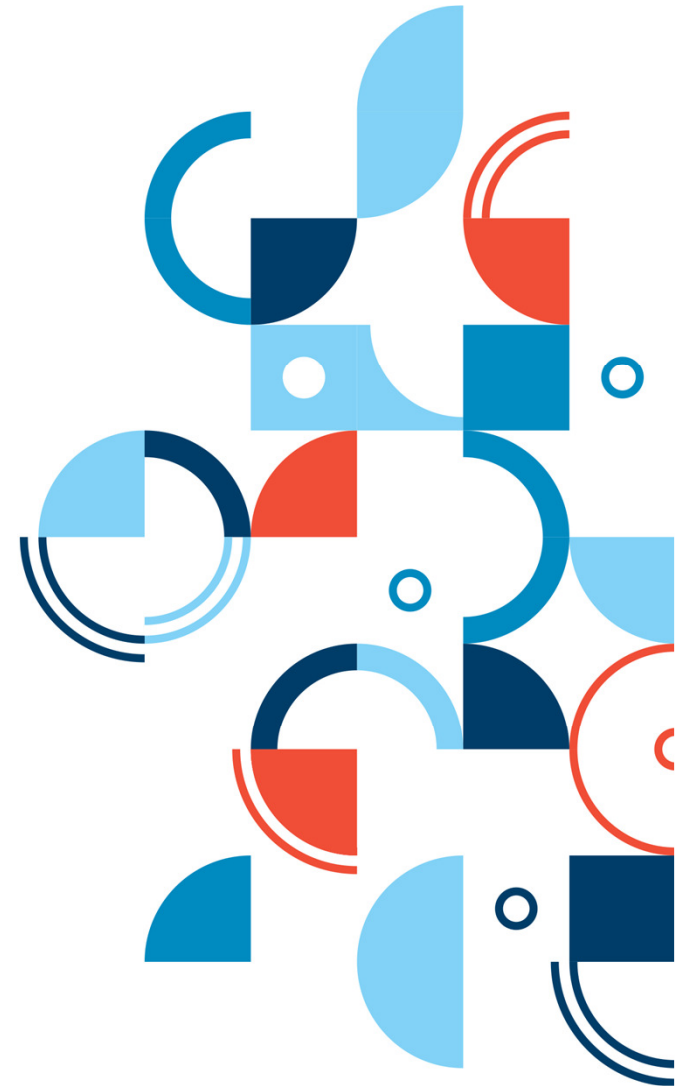


IMAC 2014

Flowing Asset Data to Intelligent Operations

Paul Tanner, Software IT Architect

09/09/2014

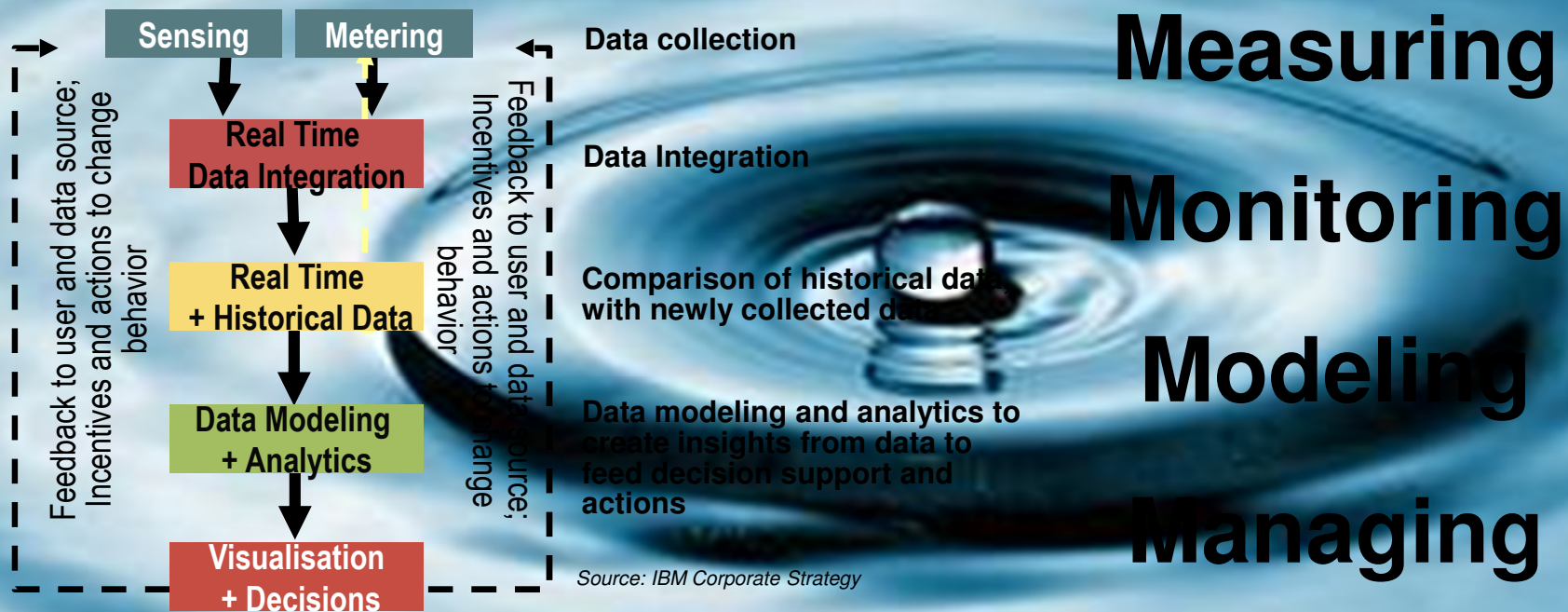




Agenda

- Why Intelligent Operations
- Case Study
- Flowing Your Asset Data

What does it mean to be Smarter?



Rio de Janeiro

Optimises city operations through
situational awareness

Leverage Data :: Anticipate Problems :: Respond Appropriately



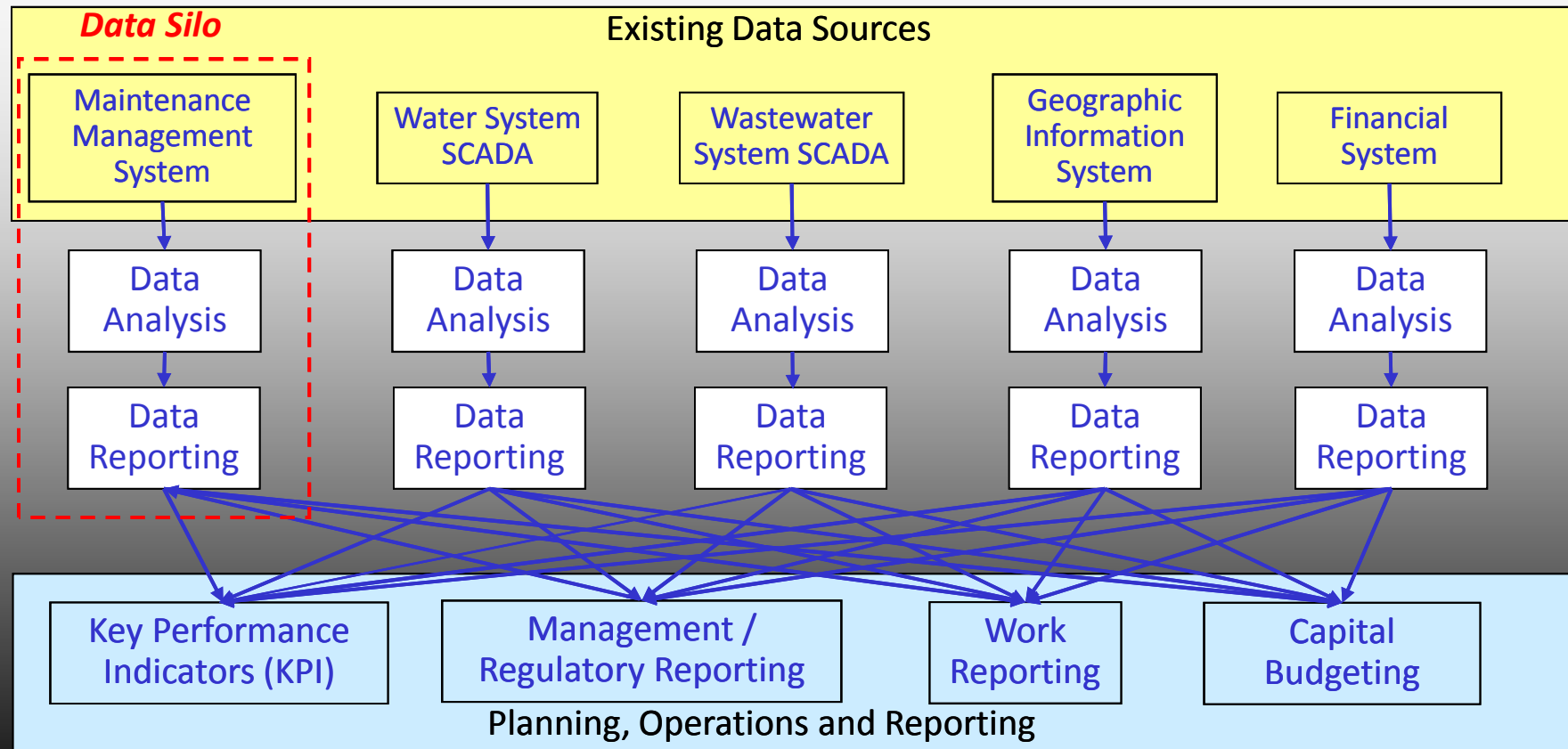


New Jersey Turnpike Authority

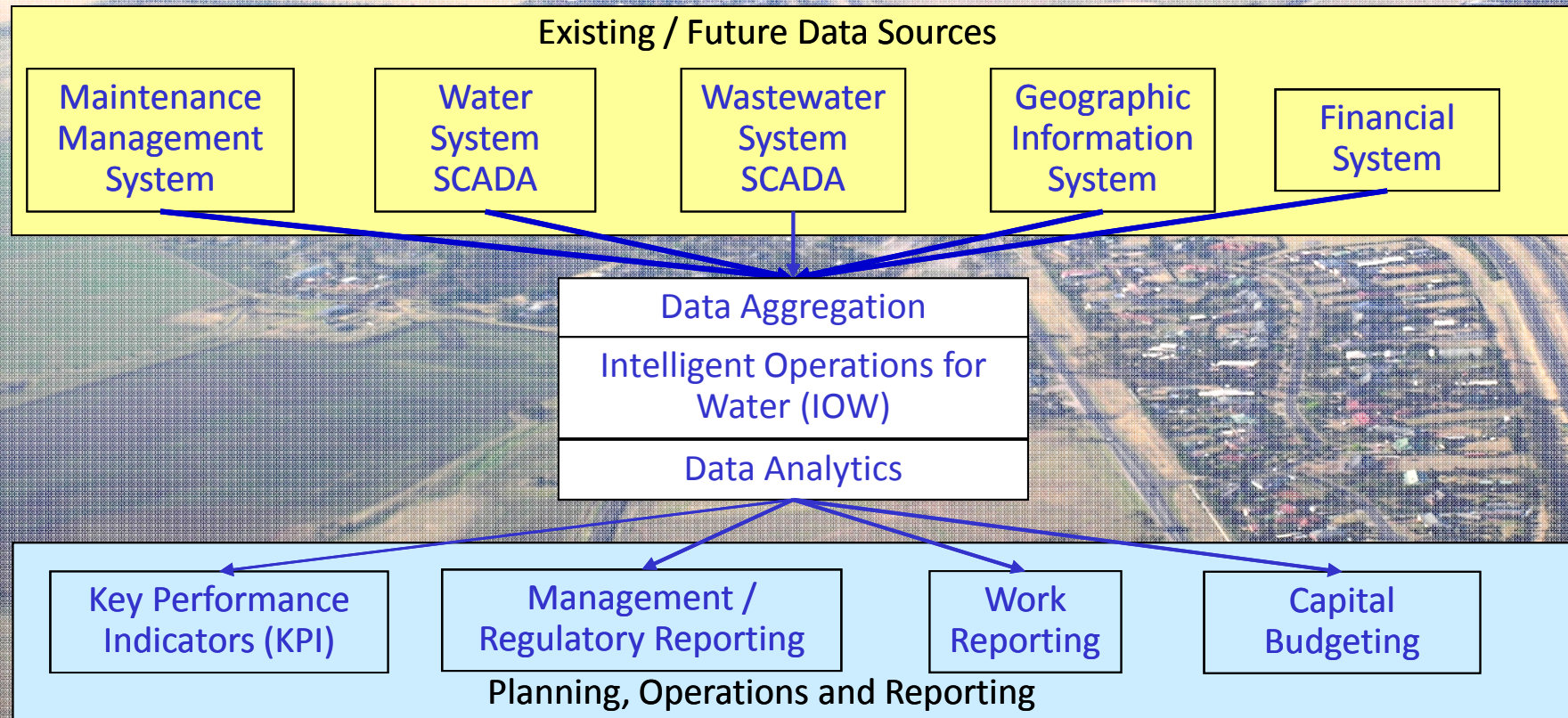
Optimises traffic flow through
sensing, prediction and control

Leverage Data :: Anticipate Problems :: Respond Appropriately

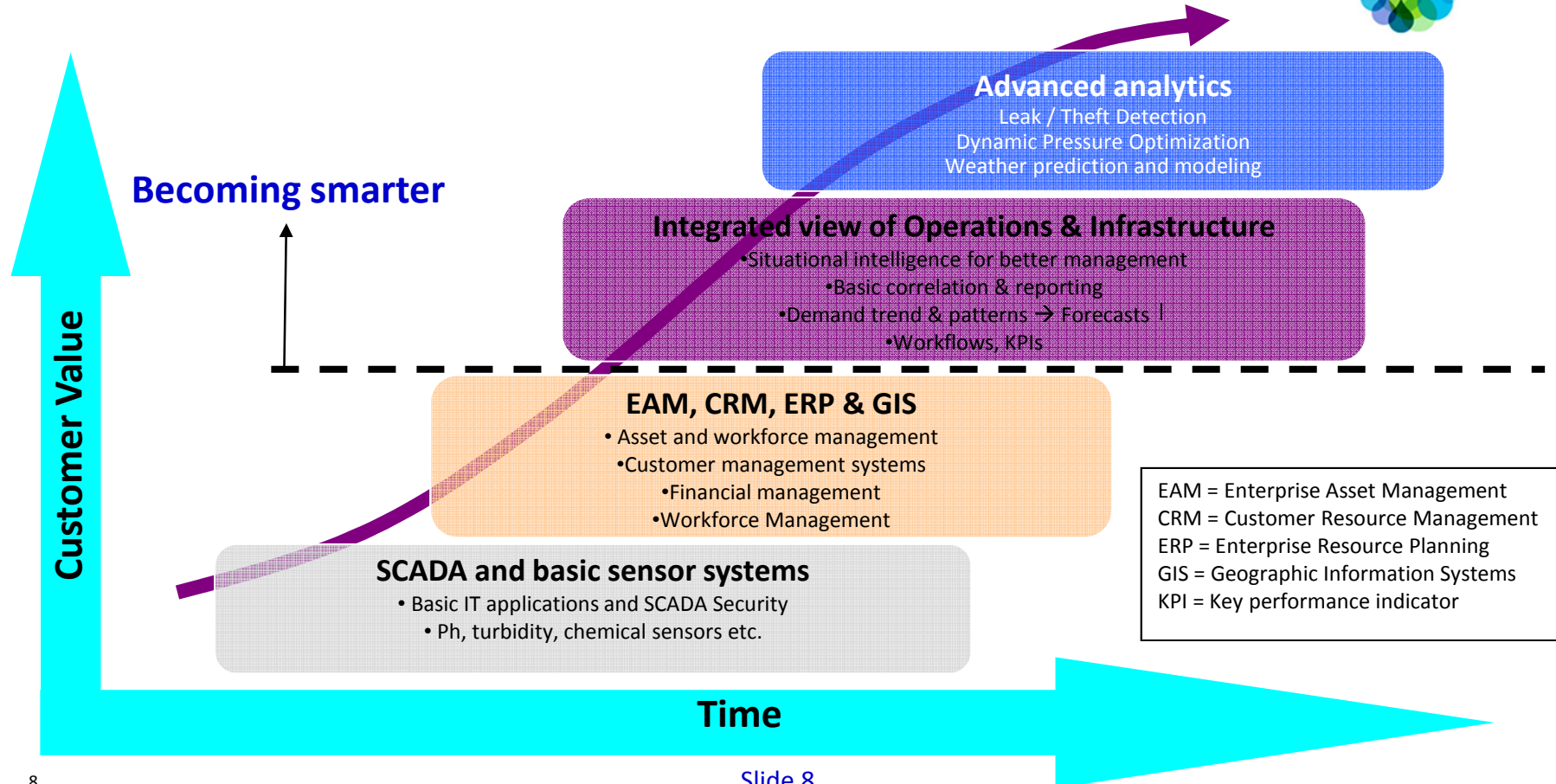
Lots of Data – Typical Water / Wastewater Environment



Smarter Water Management Solution – A System of Systems



Water Maturity Continuum





Agenda

- Why Intelligent Operations
- **Case Study**
- Flowing Your Asset Data



Western Water

Progressing towards Intelligent Operations

IMAC 2014 IBM 



Smarter Water: A System-of-Systems



External Sources?

- Bureau of Meteorology (weather, climate, water resources)

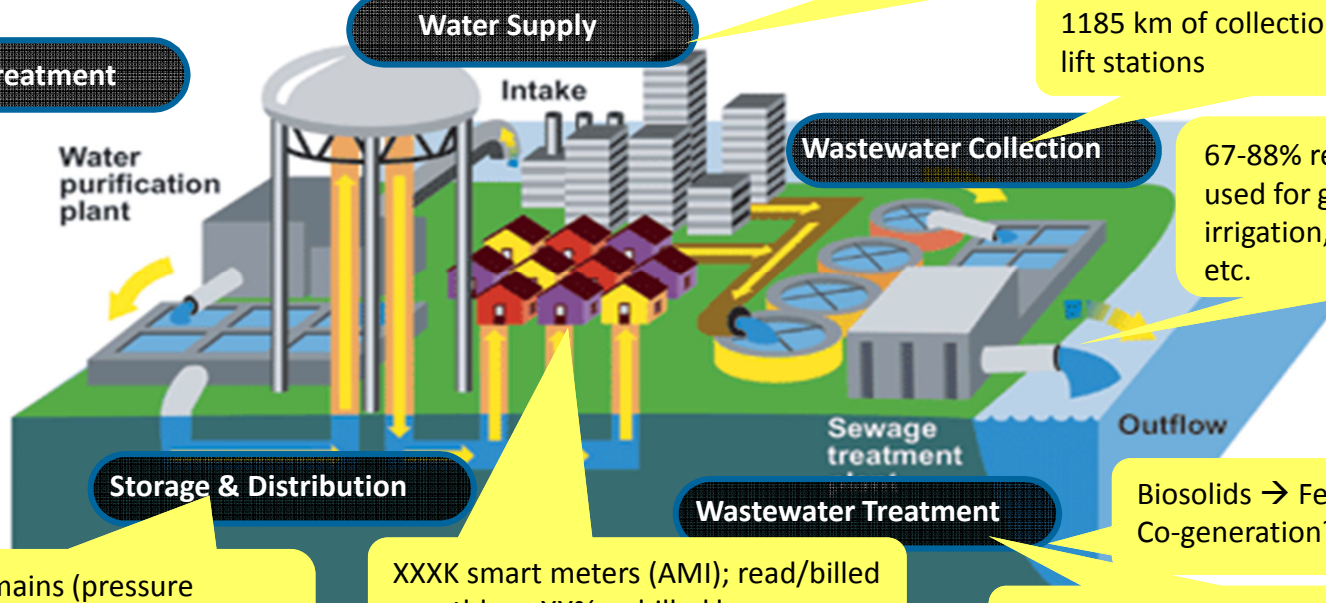
Existing Systems

- Open Spatial GIS
- CMMS/EAM (InfoMaster)
- CIS/Billing/ERP?

Wonthaggi Desal Plant, XXX MLD

- Local surface water sources (XXX MLD), Rosslynne Reservoir & Lake Merrimu
- Groundwater, bore holes (backup)
- Melbourne sources, if needed (\$\$)

Municipal water supply and sewage treatment



Water Treatment

XX Water Treatment Plants, XXX MLD

1185 km of collection systems, XX lift stations

Wastewater Collection

67-88% recycled water used for gardening, irrigation, fire protection, etc.

Storage & Distribution

XXXX km of water mains (pressure zones?); XX% > 50 years old, X ML storage tank

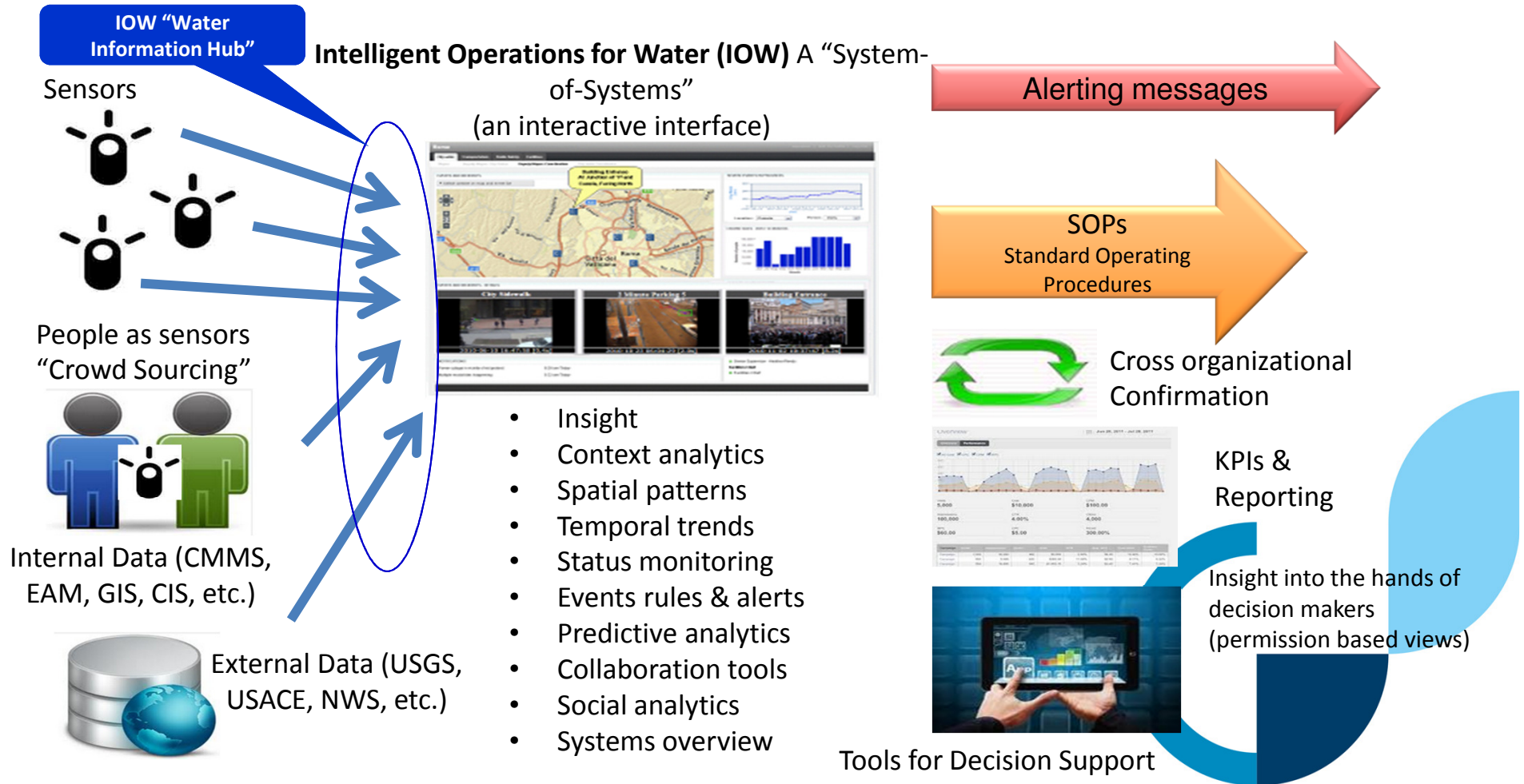
Wastewater Treatment

Biosolids → Fertilizer Biogas → Co-generation?

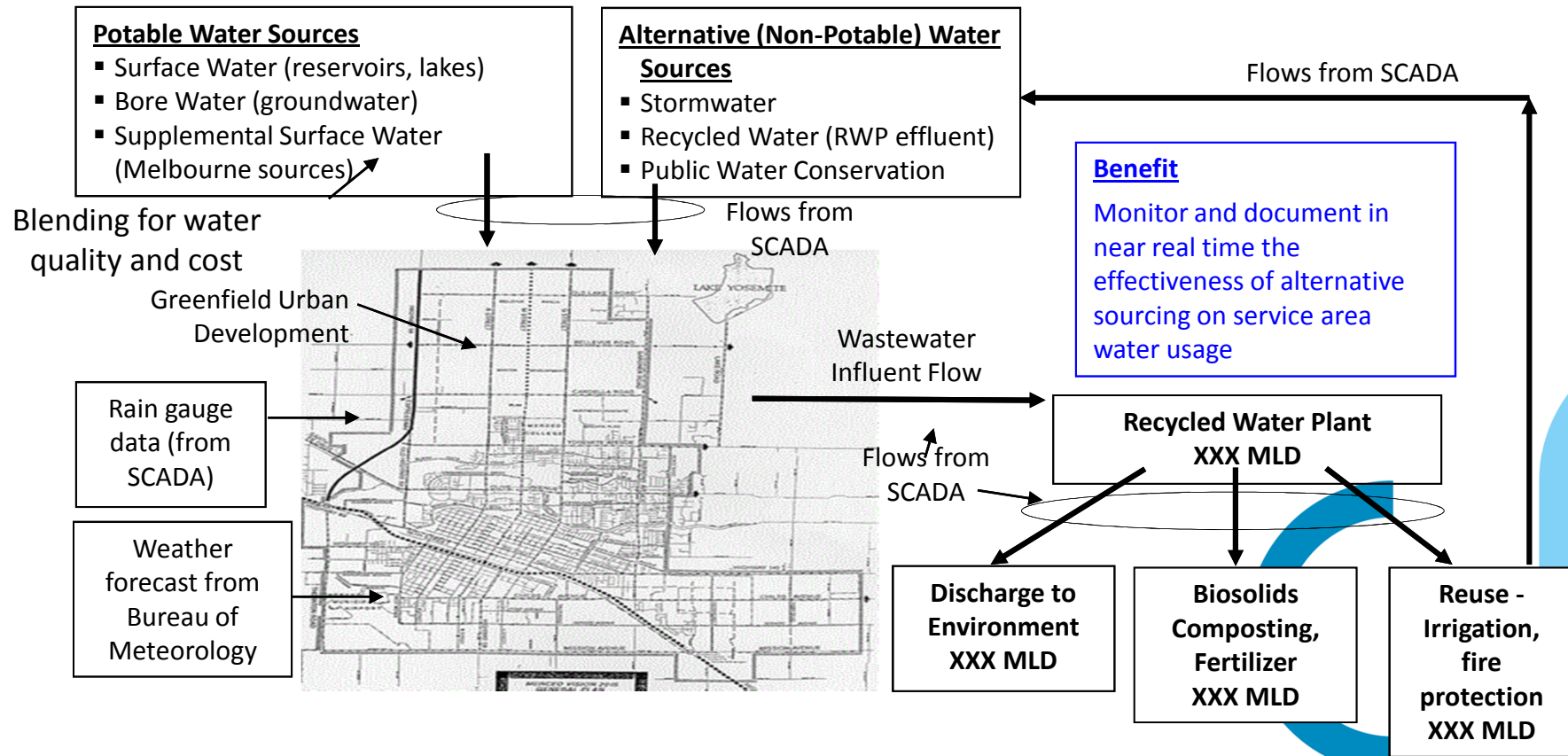
XXXX smart meters (AMI); read/billed monthly; > XX% unbilled losses

7 Recycled Water Plants, 8400 ML per year

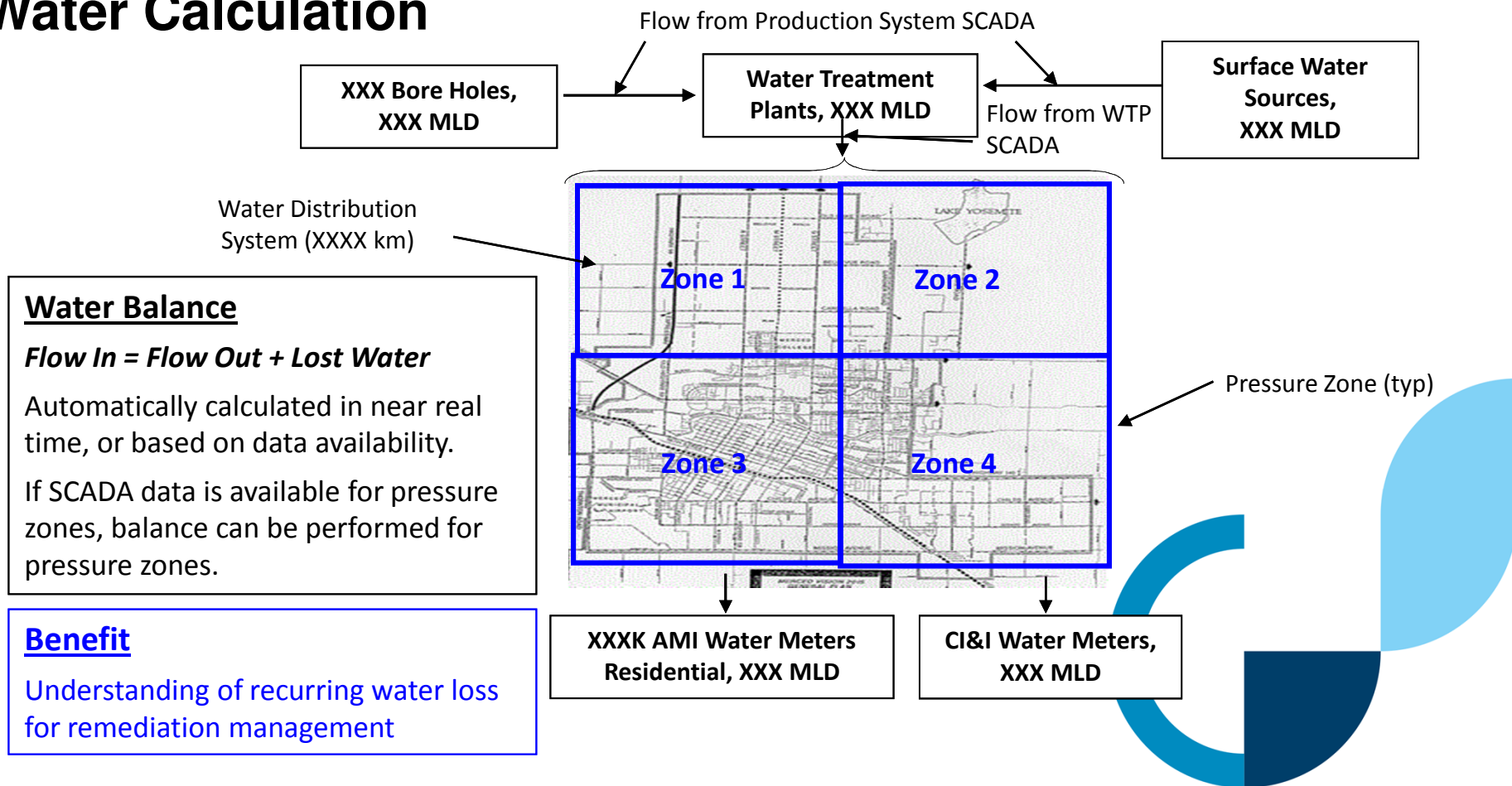
A Smarter Water Management Implementation



Potential Smarter Water Use Case – Alternative Water Service Provision in “Open Area” Competition Sites



Potential Smarter Water Use Case – Lost Water Calculation



Water Balance

Flow In = Flow Out + Lost Water

Automatically calculated in near real time, or based on data availability.

If SCADA data is available for pressure zones, balance can be performed for pressure zones.

Benefit

Understanding of recurring water loss for remediation management

Potential Smarter Water Use Case – Water Reuse Calculation

Water Balance

$$RWP \text{ Influent Flow} = \text{Discharge to environment} + \text{Reuse Flow} + \text{Biosolids Flow}$$

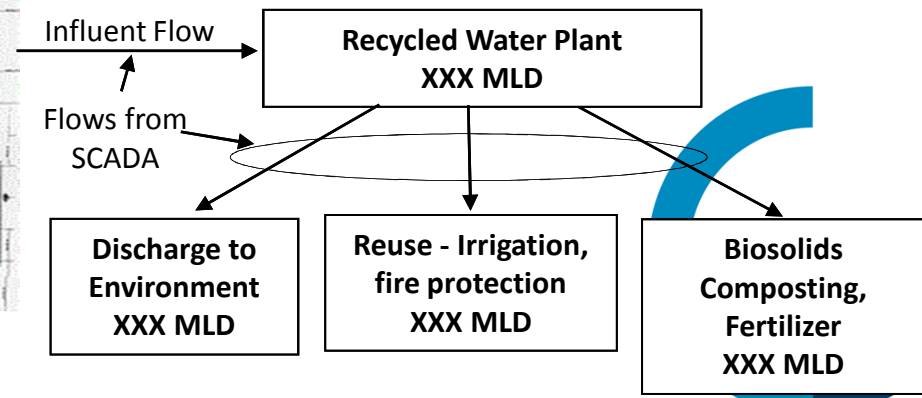
Automatically calculated in near real time, or based on data availability.



Wastewater Collection System (1185 km, XX lift stations)

Benefits

- Measuring the effectiveness of recycled water reuse initiatives
- Simplified/automated regulatory reporting

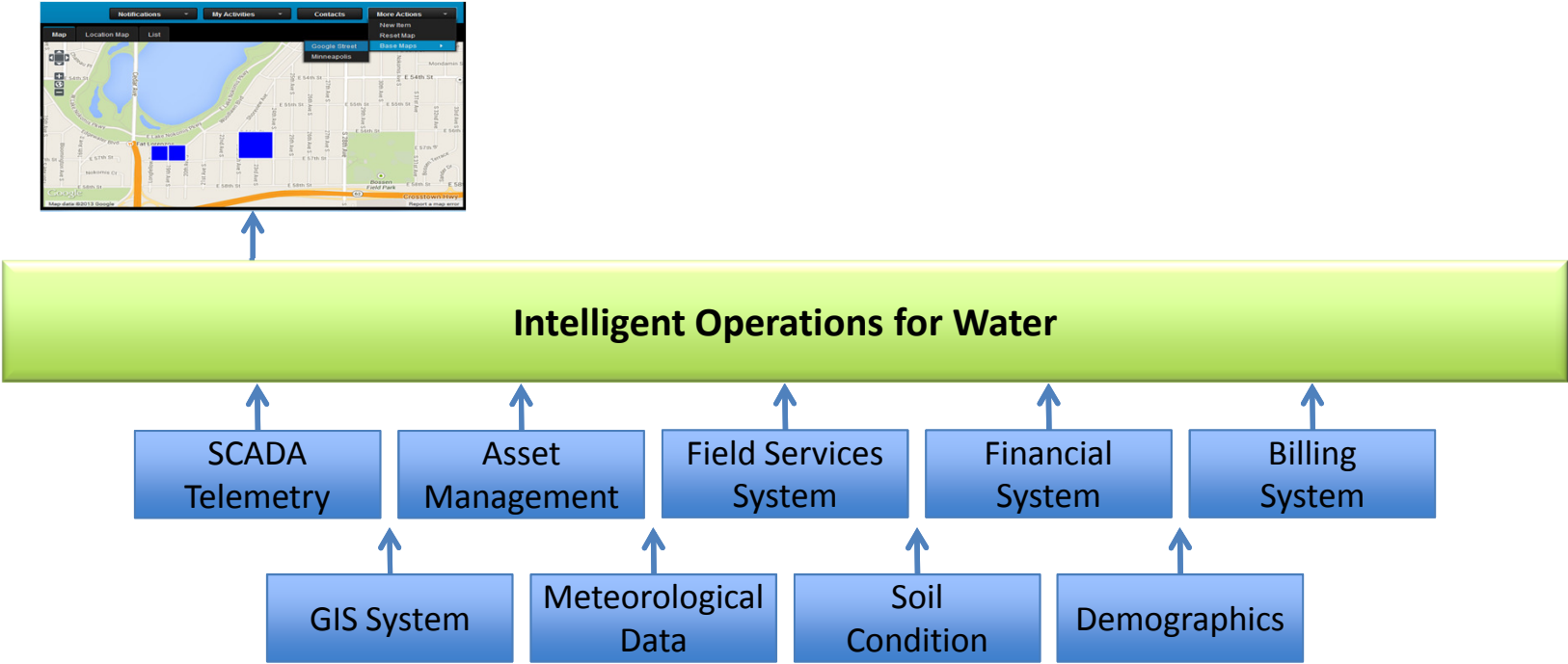


Intelligent Operations for Western Water

Daily Operations

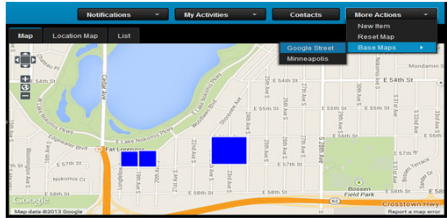
Operational Optimisation

Planning and Analysis

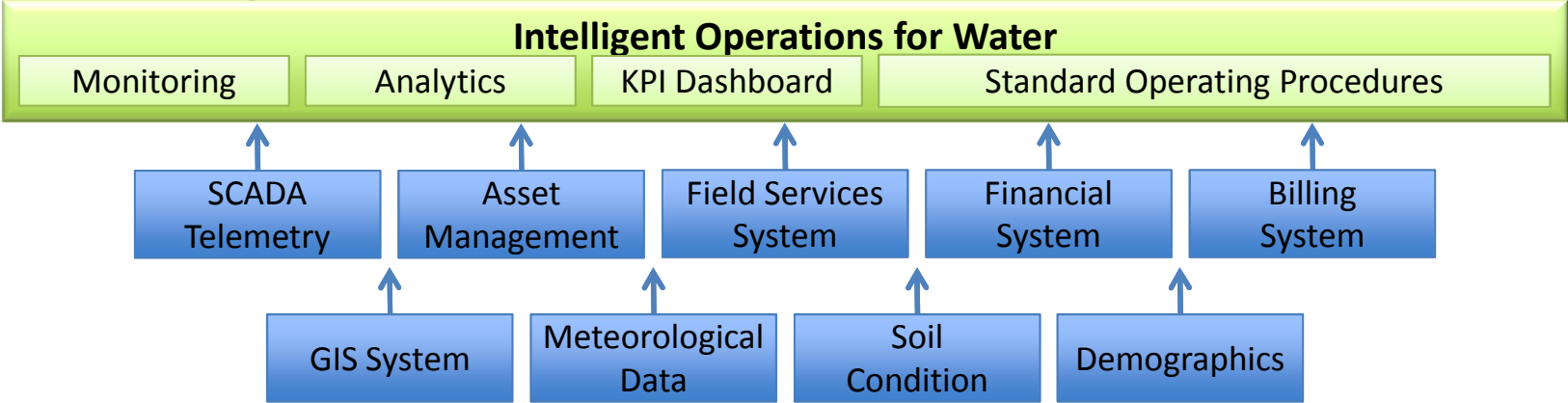


Intelligent Operations for Western Water

Daily Operations

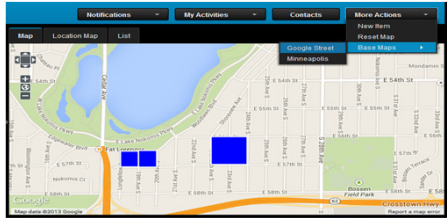


- Detect issues quickly**
- Assess impact**
- Review work order history**
- Dispatch repair teams**

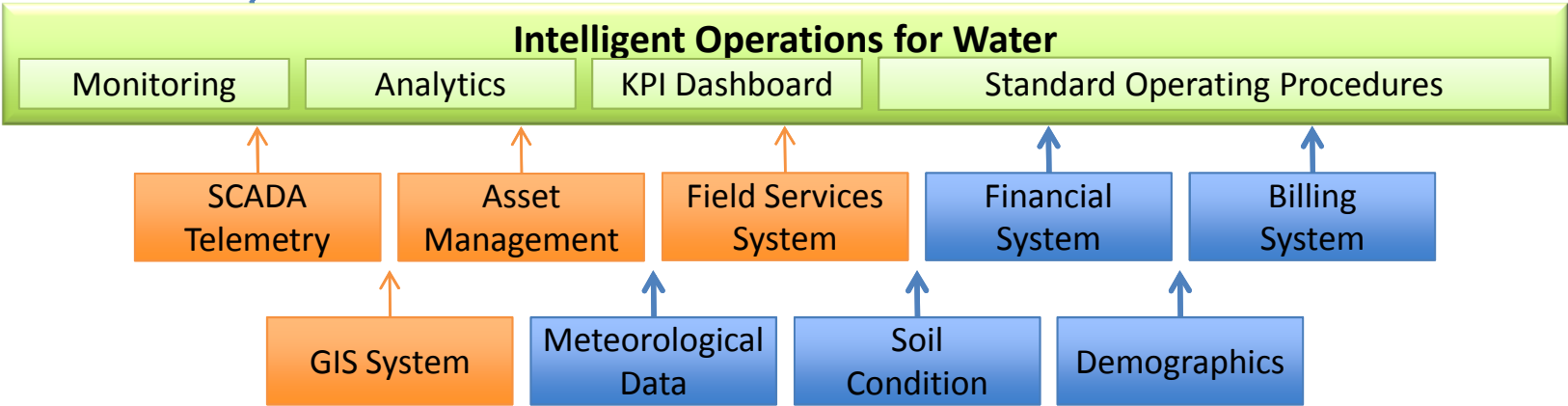


Intelligent Operations for Western Water

Daily Operations

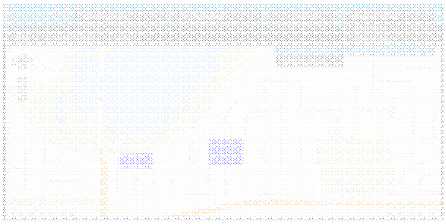


- Detect issues quickly
- Assess impact
- Review work order history
- Dispatch repair teams

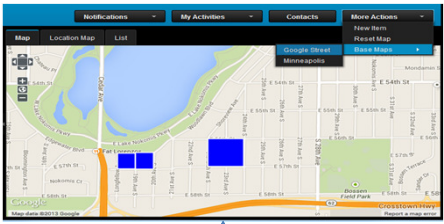


Intelligent Operations for Western Water

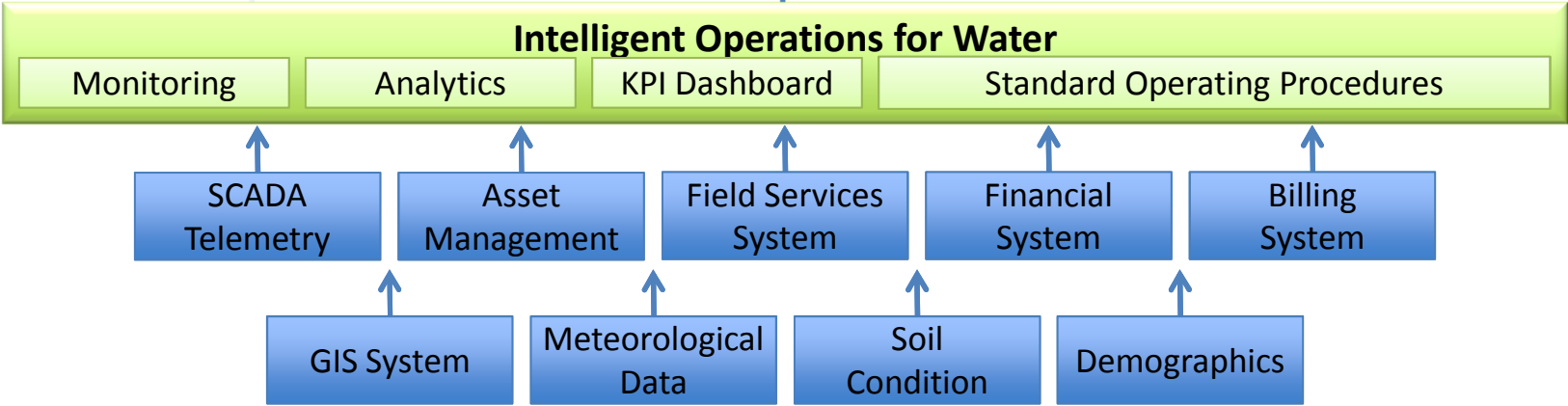
Daily Operations



Operational Optimisation

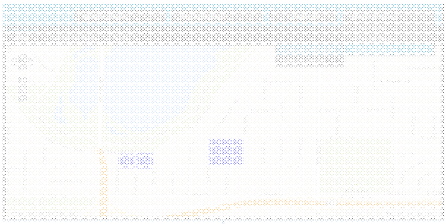


**Model demand in home
Optimise flow/pressure
Manage sourcing cost**

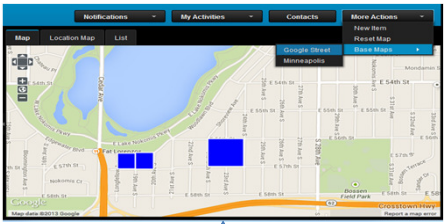


Intelligent Operations for Western Water

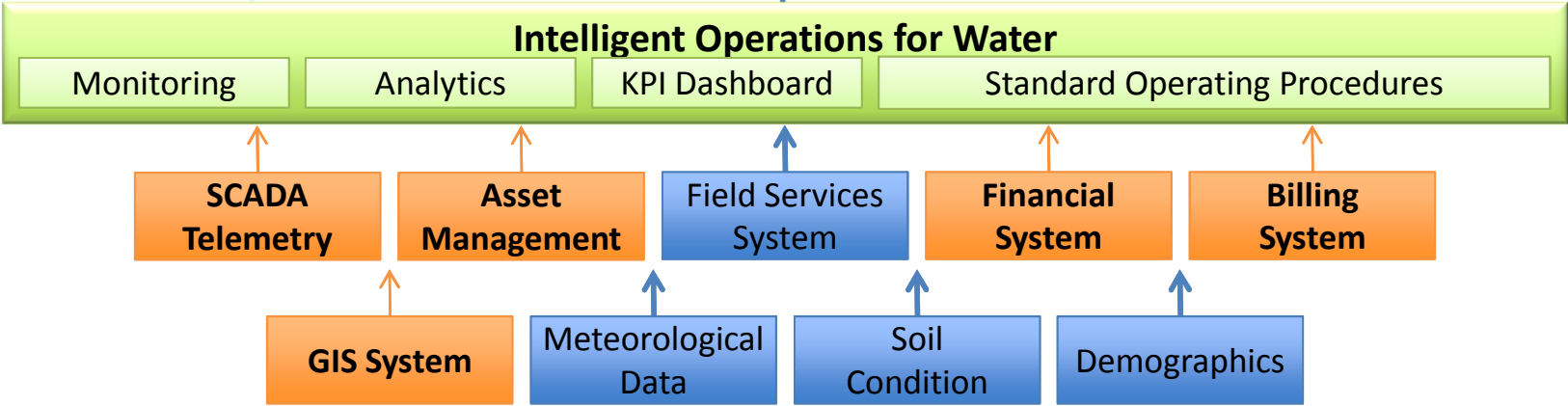
Daily Operations



Operational Optimisation



**Model demand in home
Optimise flow/pressure
Manage sourcing cost**



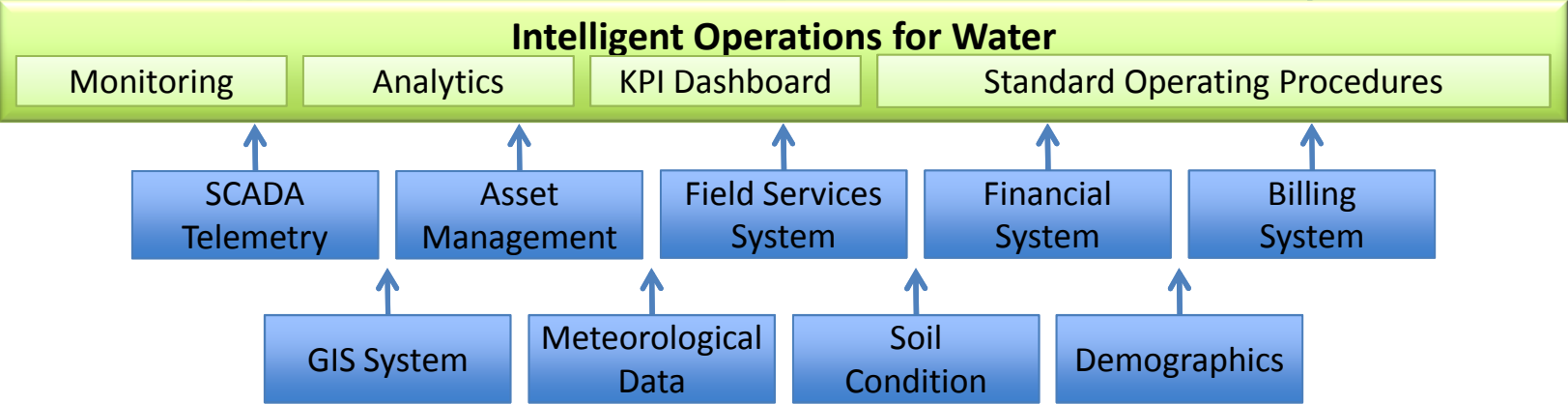
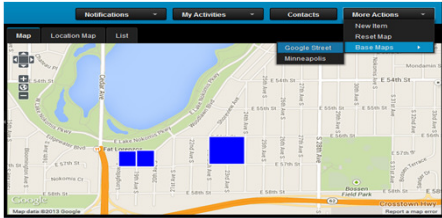
Intelligent Operations for Western Water

Daily Operations

Operational Optimisation

Planning and Analysis

- Assess future needs
- Evaluate asset utilisation
- Optimal flow, pressure, water balance
- Review portfolio capacity c.f. predicted growth



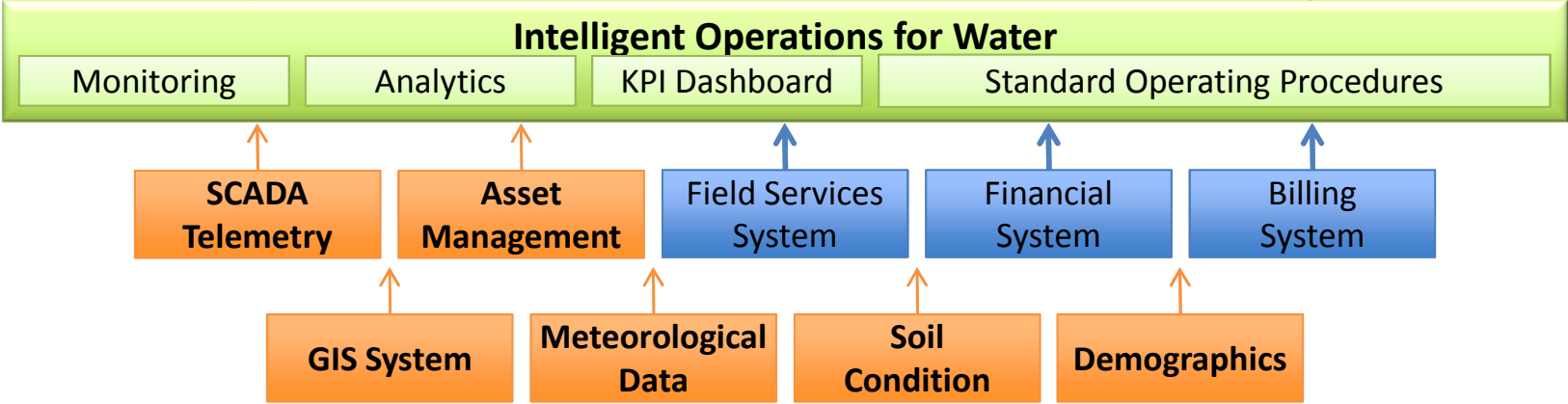
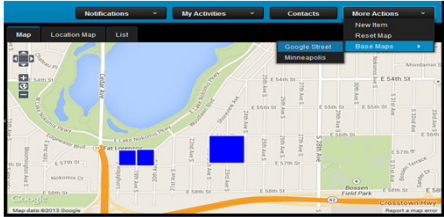
Intelligent Operations for Western Water

Daily Operations

Operational Optimisation

Planning and Analysis

- Assess future needs
- Evaluate asset utilisation
- Optimal flow, pressure, water balance
- Review portfolio capacity c.f. predicted growth

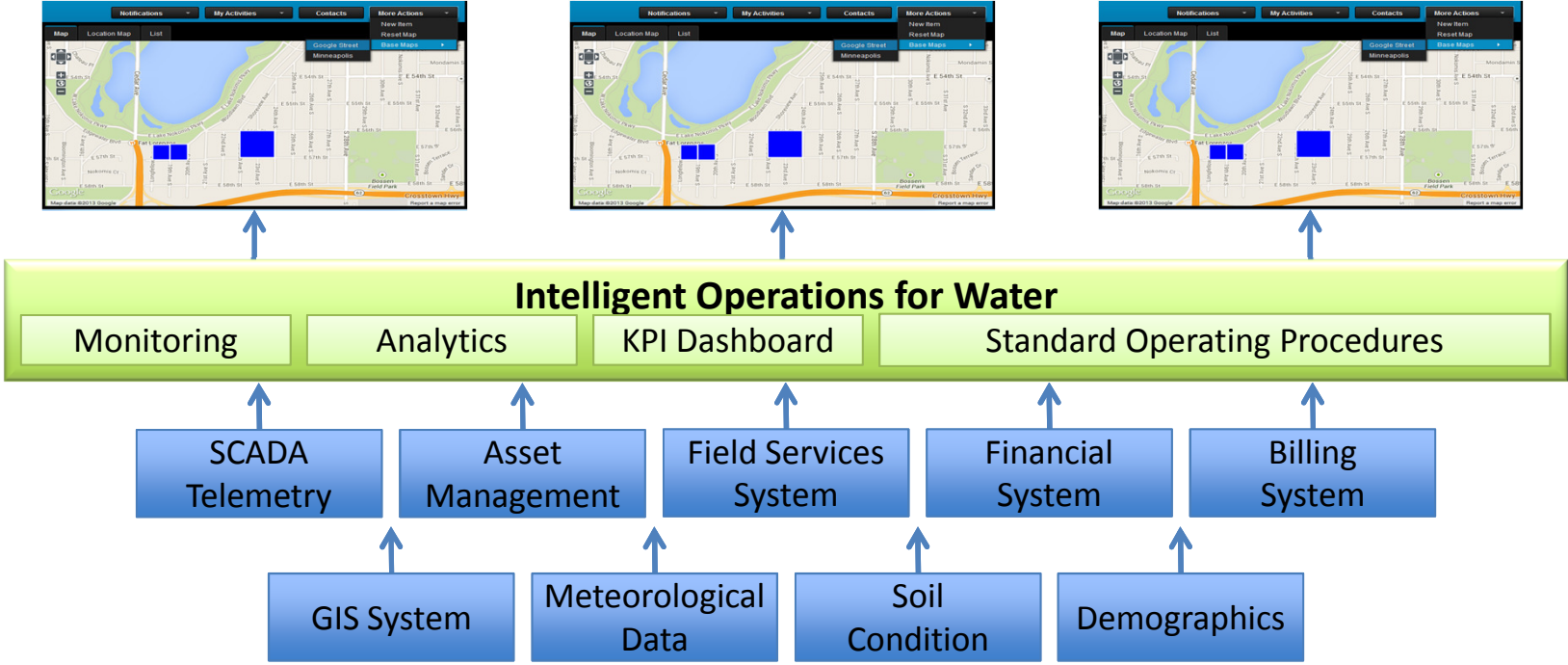


Intelligent Operations for Western Water

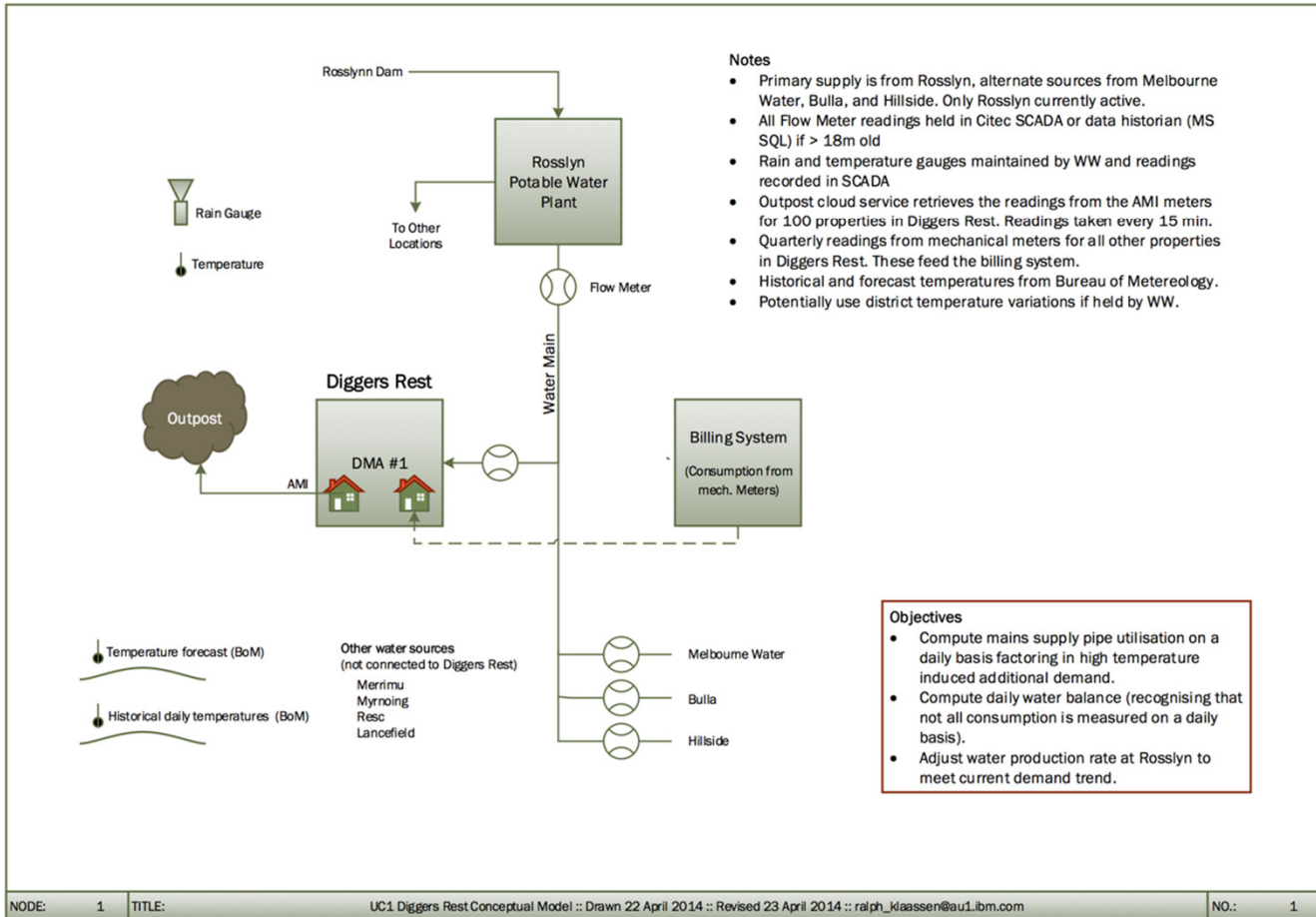
Daily Operations

Operational Optimisation

Planning and Analysis



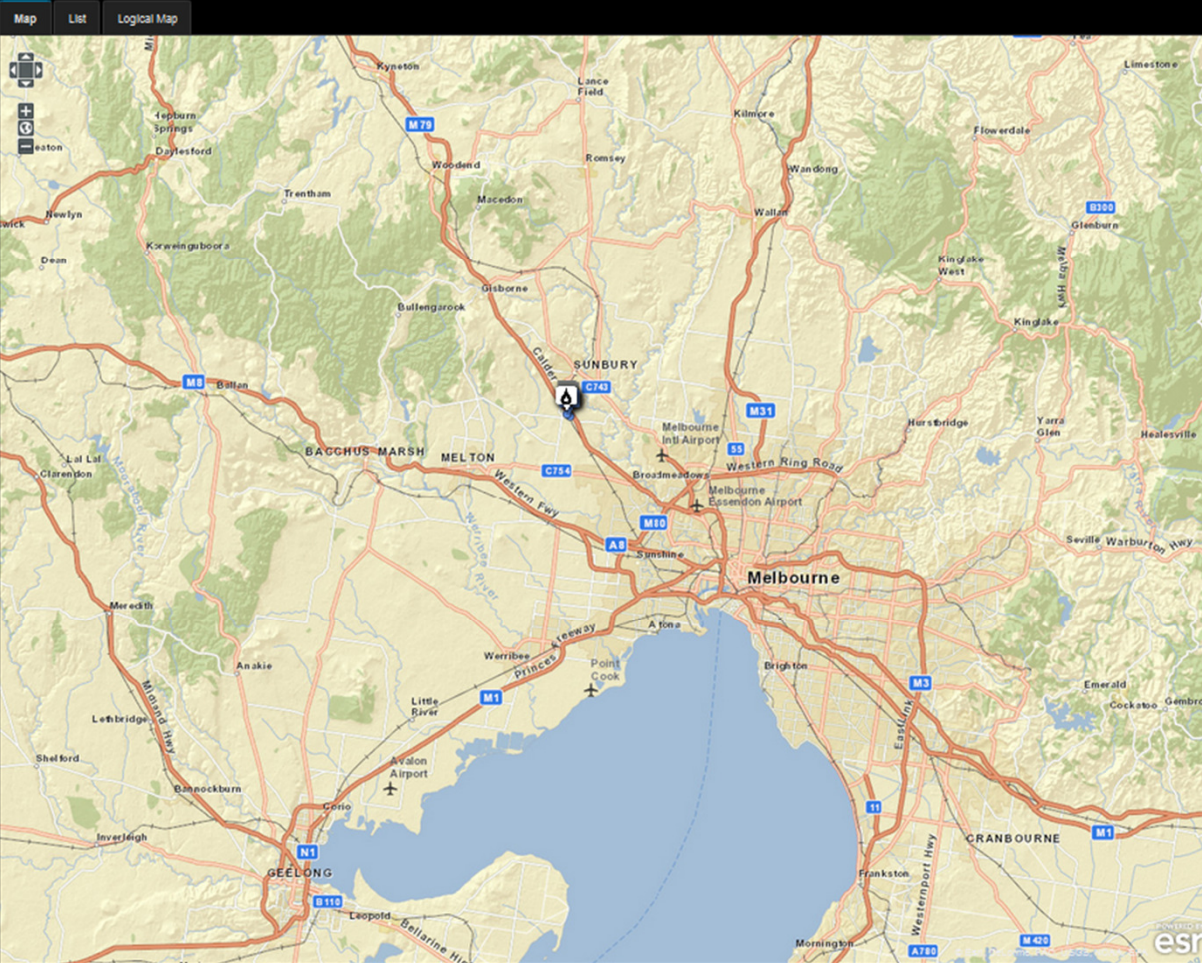
Conceptual Design



Water Operations

Notifications My Activities Contacts More Actions

- Favorites
- Date Time
- Boundary
- Assets
 - Intelligent Meter
 - DMA Inflow Meter
 - External Water Sources
 - Water Treatment Plant
 - Weather Station
- Pipe Network
- Locations
- District Metered Areas
- PSP Areas
- Suburbs
- Growth Report

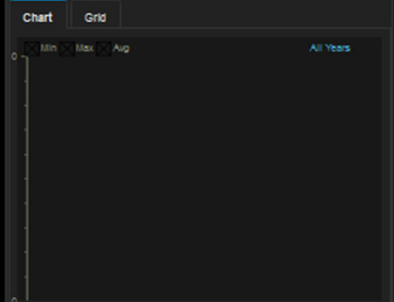
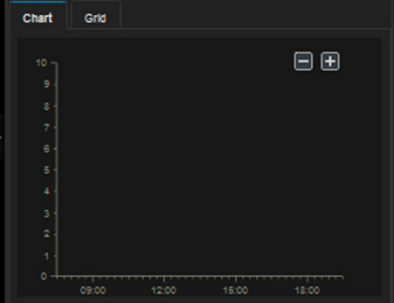


Save Clear Auto refresh: 15 Seconds

Asset Details

Status	Name	Value	Unif	Sent
Undetermined	op11795-DMA Mulloc		Litres	
Undetermined	op11795-DMA Mulloc		Litres	
Undetermined	op11795-DMA Mulloc		Perce	
Undetermined	op11795-DMA Mulloc		Perce	
Undetermined	op11795-DMA Mulloc		Litres	
Undetermined	op11795-DMA Mulloc		Litres	

Total: 6 Selected: 1 10 25 50 All



Western Water
Views - Reports - Administration -
Johnathan Gardner
IBM

Water Operations
Notifications
My Activities
Contacts
More Actions

Map | List | Logical Map

Map

Assets

- Intelligent Meter More...
- DMA Inflow Meter More...
- External Water Sources
- Water Treatment Plant More...
- Weather Station More...

Pipe Network ✓

Locations 🟢

District Metered Areas 🔴

PSP Areas 🟠

Suburbs 🟡

Growth Report 🟢

Save Clear

Auto refresh: 15 Seconds

WesternWater_Victoria_op8304

op8304

Status Undetermined

Asset Type IntelligentMeter

Key Measurement

Value

Unit

Trend Unknown

Sent

[More details](#)

Asset Details

Status	Name	Value	Unit	Sent
Undetermined	op8304 Usage	0.32	Litres	7 May 2014 23:33

Total: 1 Selected: 1

Chart Grid

Chart

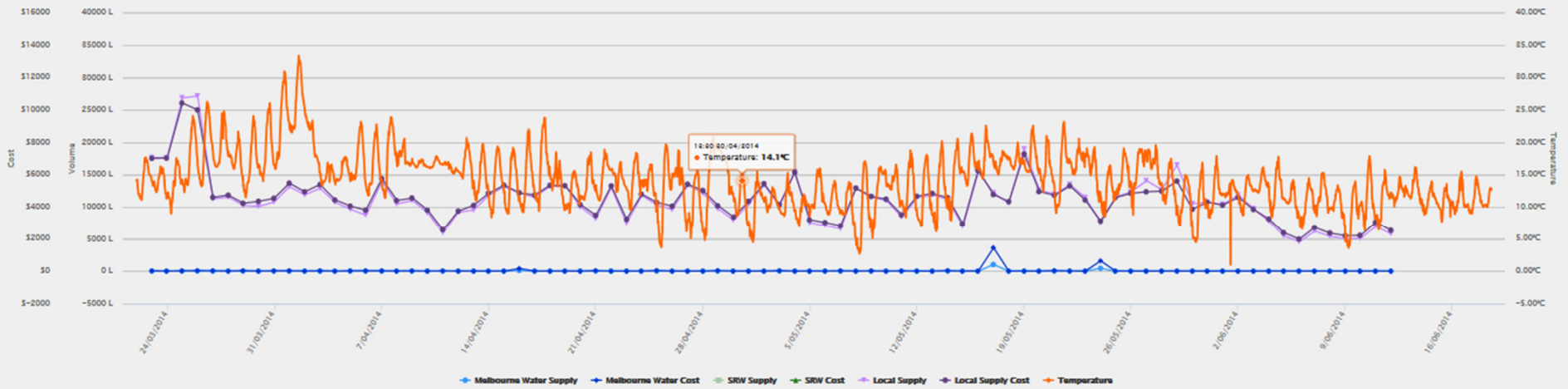
Chart Grid

Chart

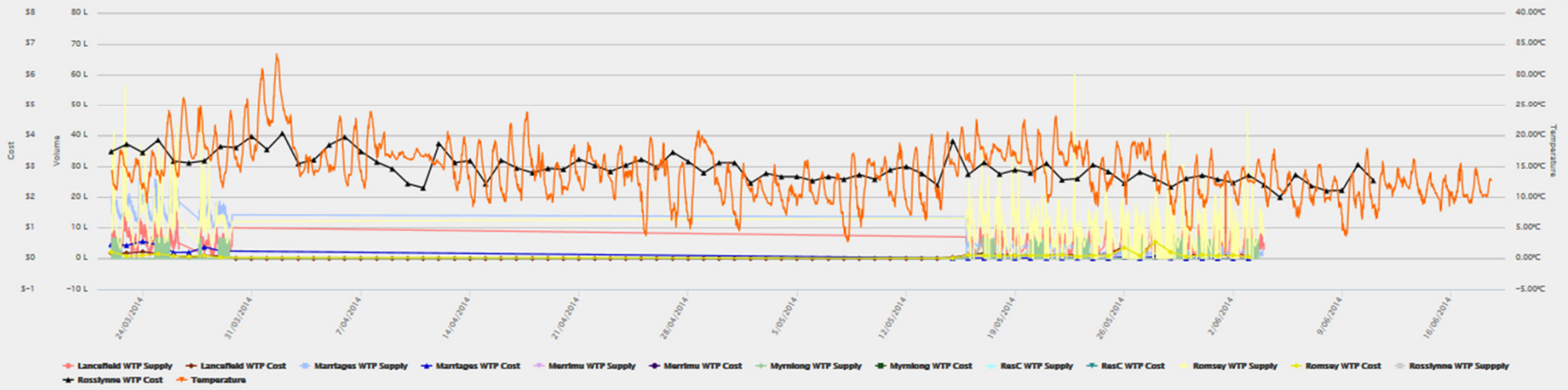
Date Range: 2014-03-22 - 2014-06-22

Granularity: 100%

Water Supply Cost Report

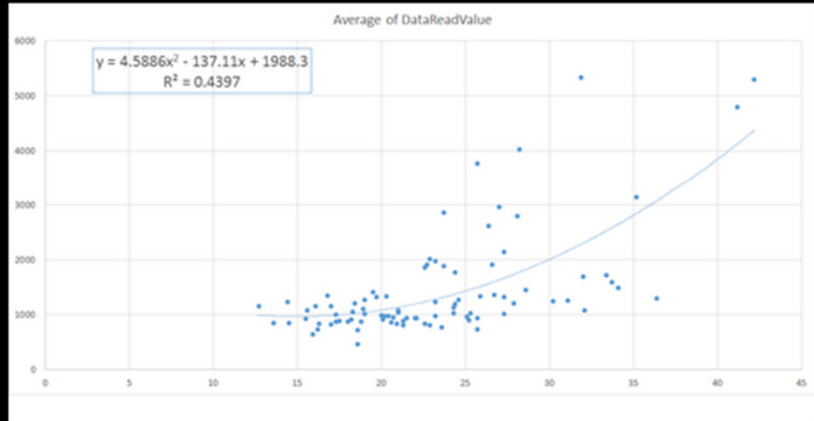
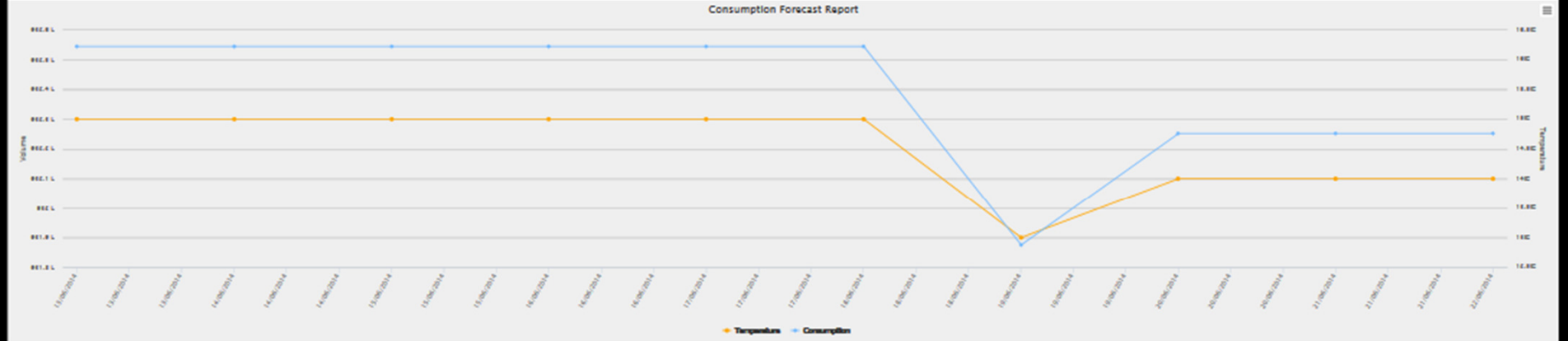


Local Water Supply Cost Report



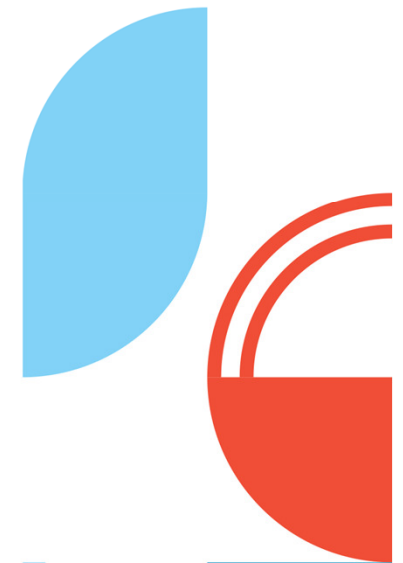
Consumption Forecast

Data Range
2014-03-22 - 2014-09-22



What's Next for Western Water

- Expansion of the pipe network model to the entire Western Water service district
- Further integration of the Financial Management data for billing and costs
- Incorporation of asset maintenance data
- Addition of further reports





Agenda

- Why Intelligent Operations
- Case Study
- **Flowing Your Asset Data**



Flowing Your Assets

- The Challenge – of non-revenue costs
- Managing Real Losses
- Resolution

The Challenge:

How to reduce non-revenue water costs?

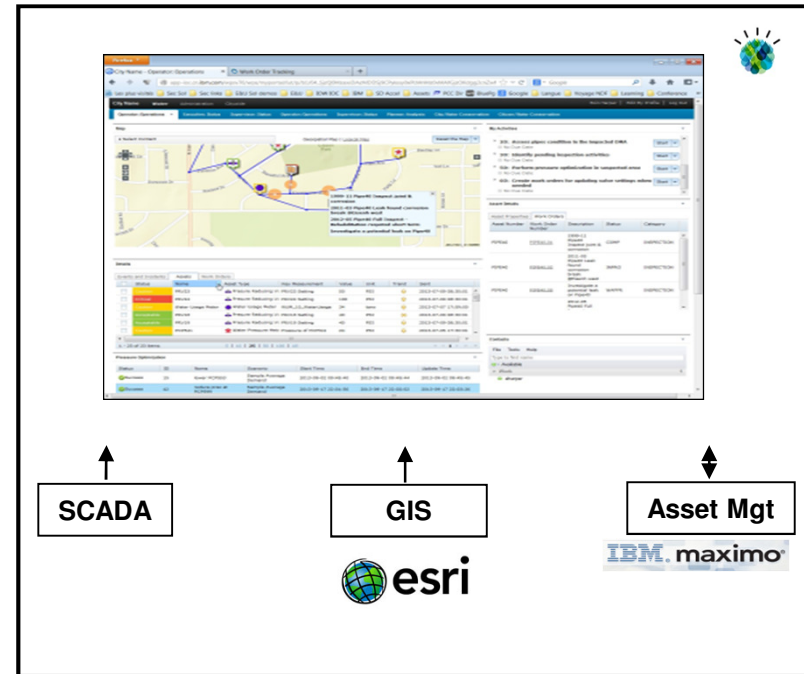


60%

Worldwide, up to
of water is lost due to leaky pipes—to
the tune of **US\$14 billion every year.**¹

¹ Environmental Protection Agency
Source: IBM

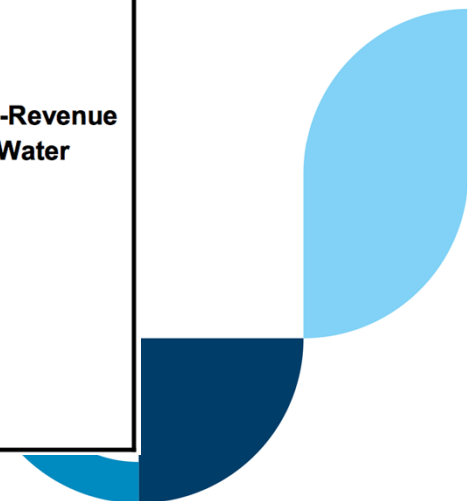
How to integrate
and better
manage key
applications to
reduce costs
(water loss,
operations)



IBM can help your water utilities' COO, CFO and CEO in **reducing leakage losses** on shortest notice **by immediate targeted pressure management** and **leakage investigation**.

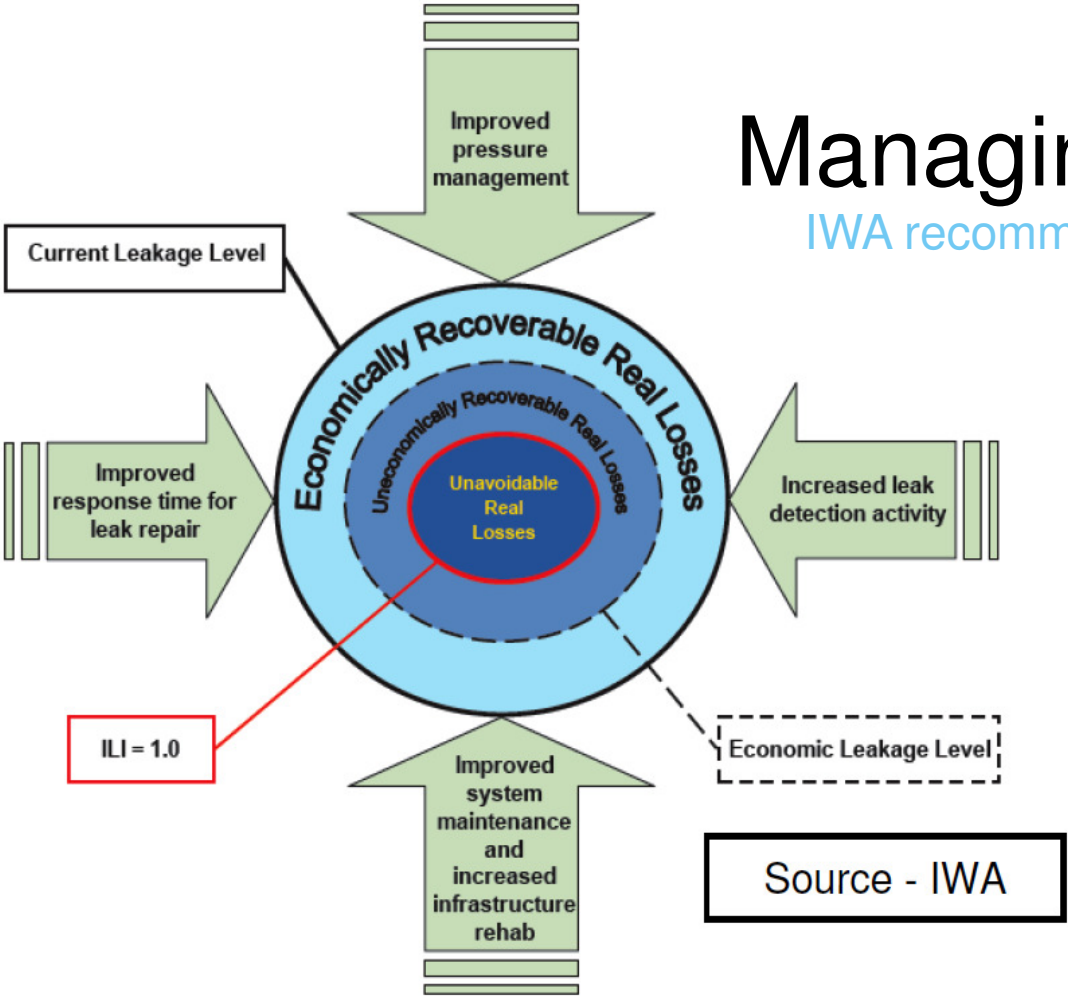
The IWA 'best practice' standard water balance

System Input Volume	Authorized Consumption	Billed Authorized Consumption	Billed Metered Consumption	Revenue Water
			Billed Unmetered Consumption	
		Unbilled Authorized Consumption	Unbilled Metered Consumption	Non-Revenue Water
			Unbilled Unmetered Consumption	
	Water Losses	Apparent Losses	Unauthorized Consumption	
			Metering Inaccuracies and Data Handling Errors	
		Real Losses	Leakage on Transmission and/or Distribution Mains	
			Leakage and Overflows at Utility's Storage Tanks	
Leakage on Service Connections up to Point of Customer Metering				



Managing Real Losses

IWA recommends four interlinked activities



Main activities from event discovery to resolution

Monitor

- Detect abnormal data coming from SCADA

Analyze

- Assess pipe condition in DMA area
- Identify pending inspection activities

Act

- Send inspection team to suspected leakage location
- Calculate optimal pressure to be applied in suspected area
- Set pressure reducing valves



Functional Scope of Leakage Management Solution

Monitor	UC1	Display and identify hot spots of water flows
	UC2	Browse planned leak detection and repair work orders
Analyze	UC3	Overlay pipe asset age and water mains condition
	UC4	View work orders history
	UC5	View impact on special needs
Act	UC6	Launch action on priority hot spot
	UC7	Run pressure analysis and valve settings optimization
	UC8	Create WO for changing valve settings

