Caribbean Regional Conference
Water Loss 2023
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Network Zoning and Automation of DMA Water Balance

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SWITLink
SMART WATER INFRASTRUCTURE TECHNOLOGIES

Smart Water Analytics LLC

Objectives

- Offer an overview of developing district metered areas (DMAs) in a water distribution networks from basic to advanced

- The role of smart "tools" in developing DMAs

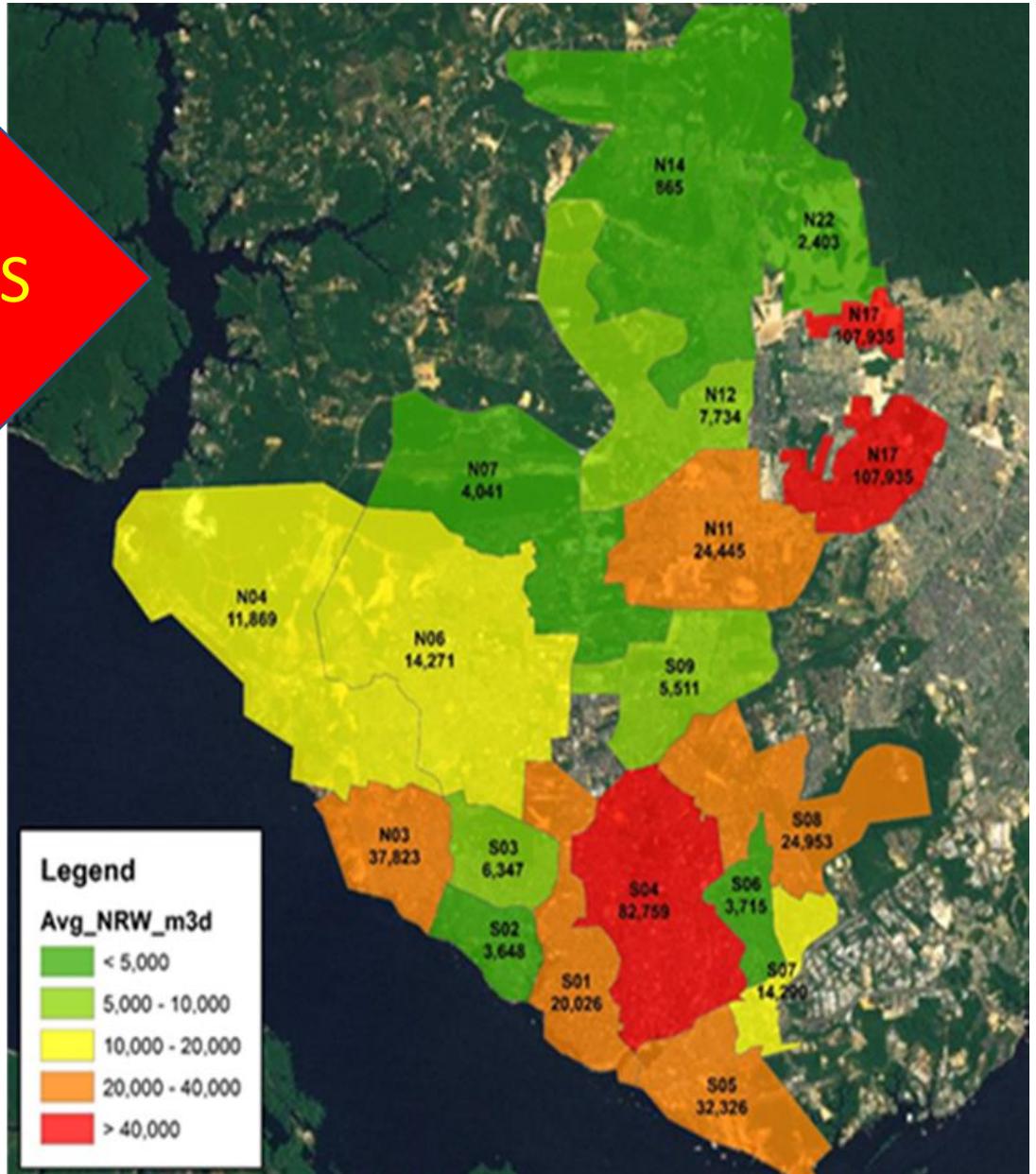- Show the importance of data integration and automation

Basic Definition of a District Metered Areas (DMAs)

A district metered area (DMA) is a sector of a water distribution network where <u>both</u> -- **water supply** and **consumption** of are metered.
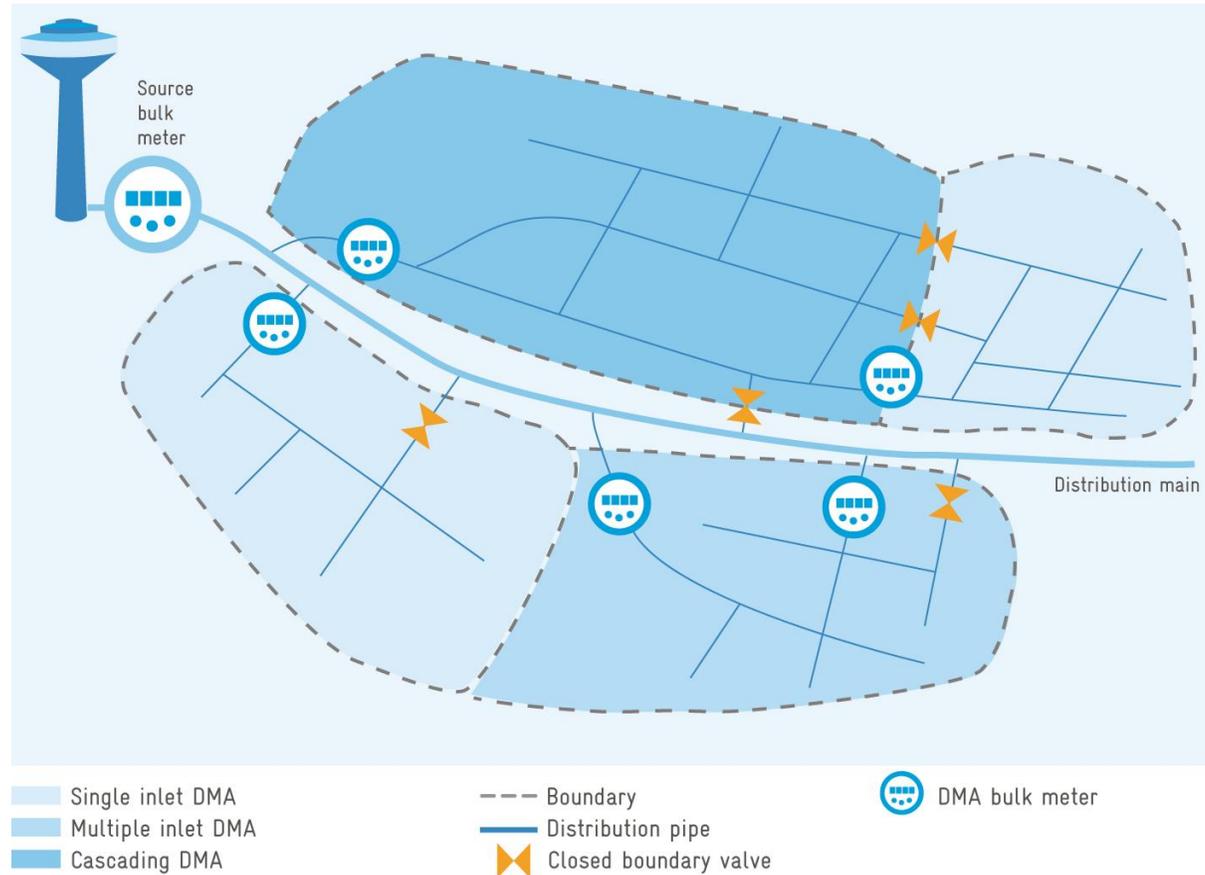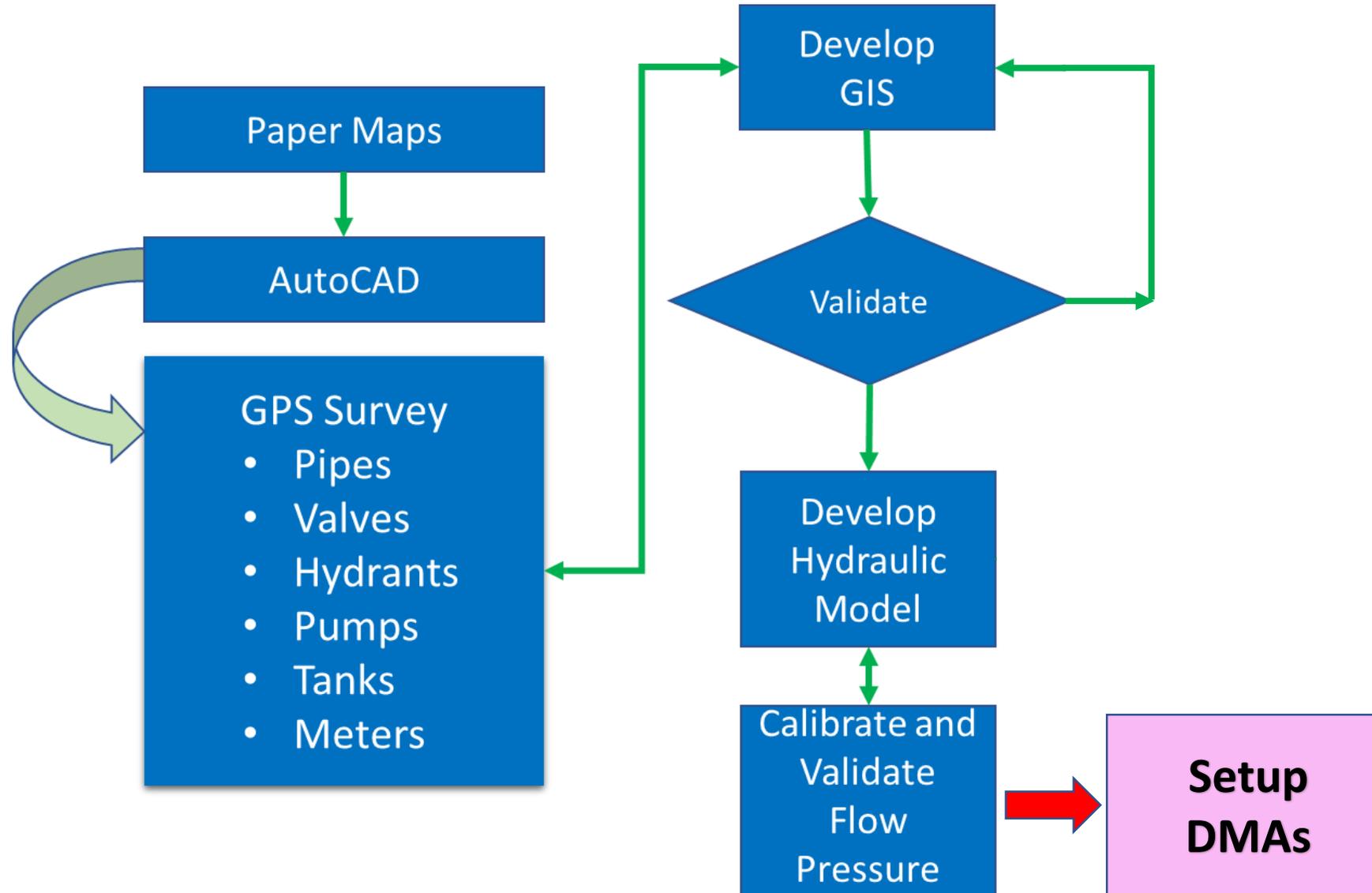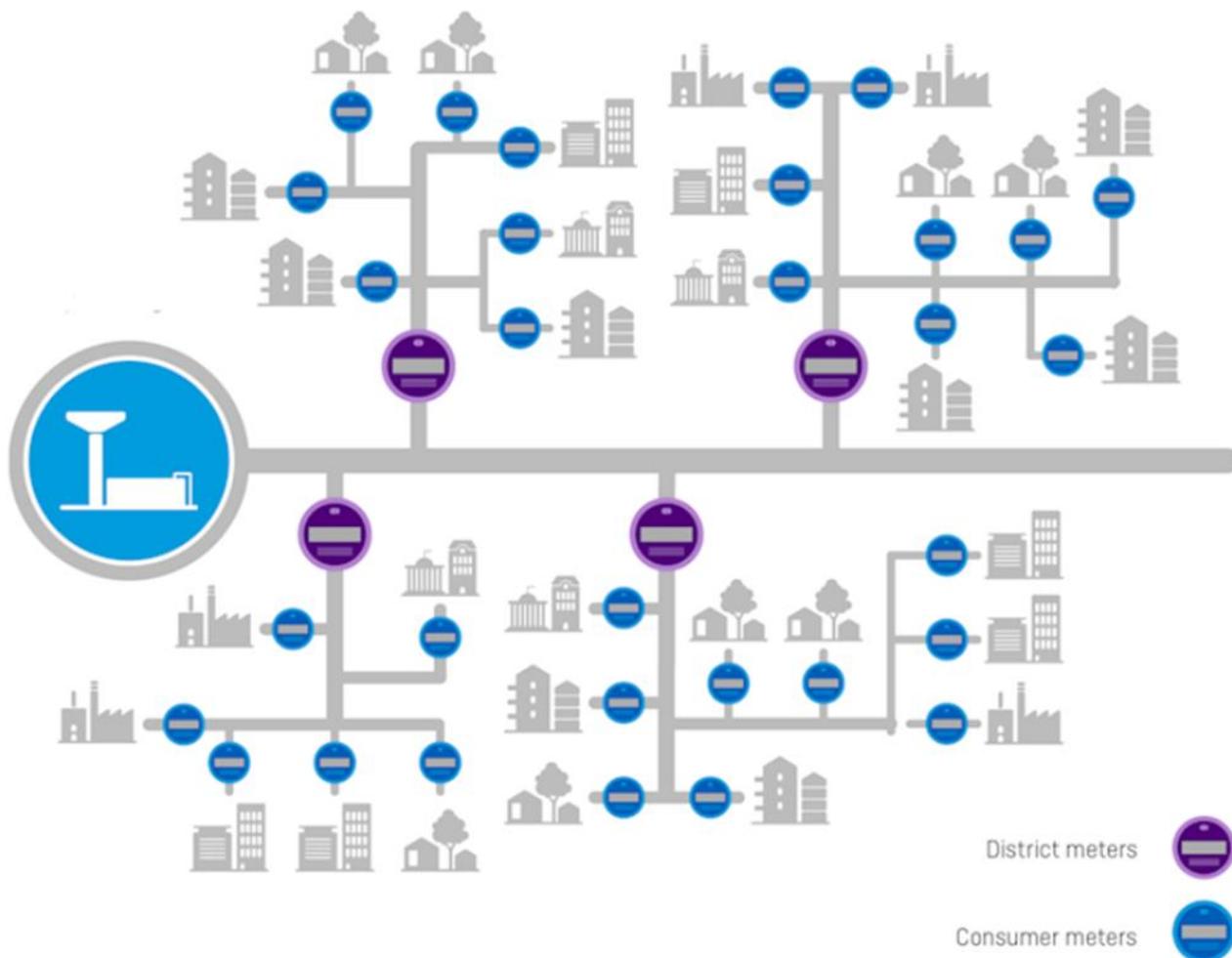
Why DMAs?

The Water Audit provides a system wide snapshot of the total volume and revenue losses of the water utility – but it does not provide the detailed information needed to design a water efficiency strategy.

From this → TO THIS

Service Area

Legend

Avg_NRW_m3d
- < 5,000
- 5,000 - 10,000
- 10,000 - 20,000
- 20,000 - 40,000
- > 40,000

N14 865
N22 2,403
N17 107,935
N12 7,734
N17 107,935
N07 4,041
N11 24,445
N04 11,869
N06 14,271
S09 5,511
N03 37,823
S03 6,347
S08 24,953
S04 82,759
S06 3,715
S02 3,648
S07 14,280
S01 20,026
S05 32,326

0   2.5   5 Km

Evolution of Smart Tools and DMAs

Setting up the DMAs

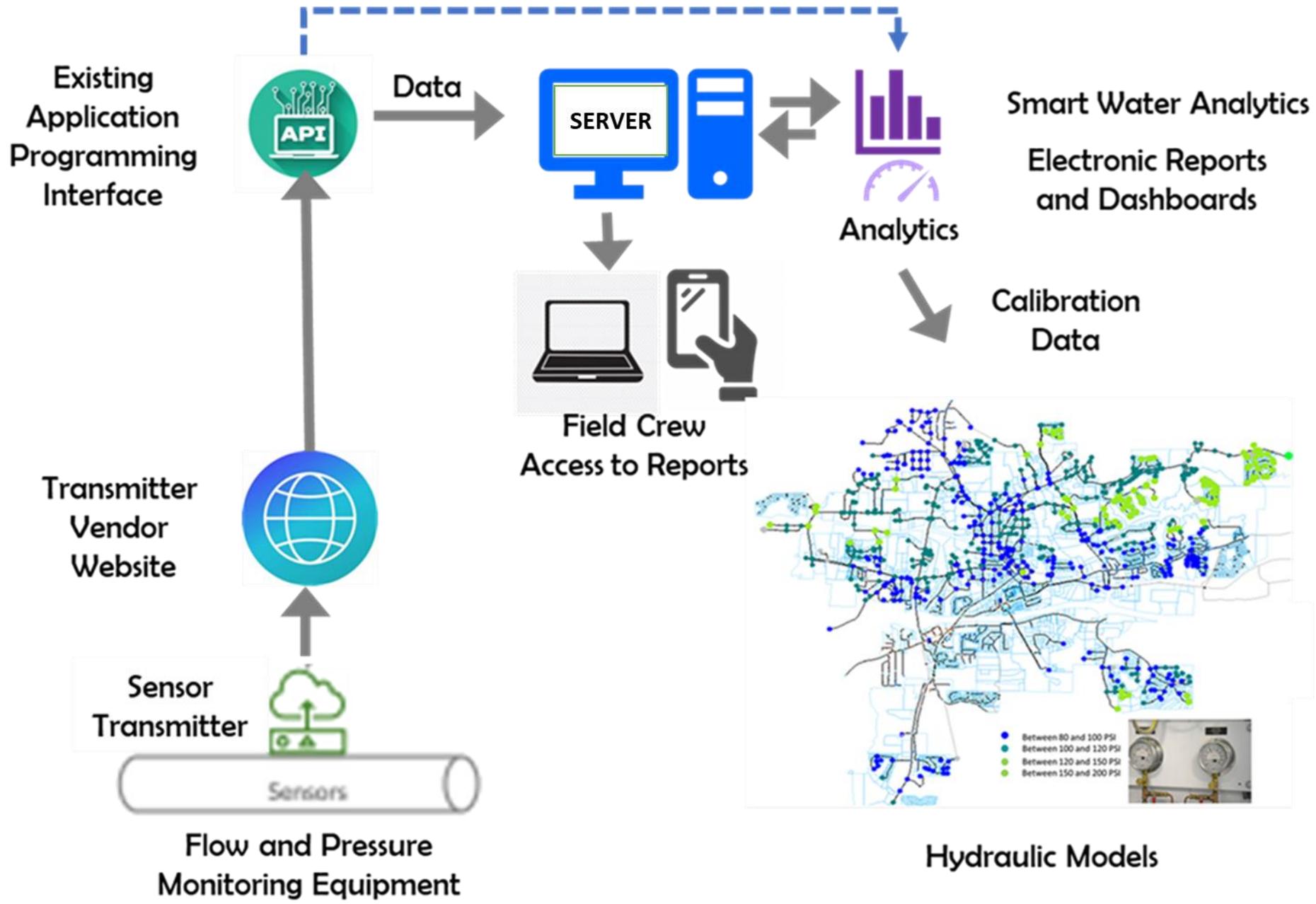## DMA Setup Phase 1

- Isolate the area
- Install bulk meters and pressure sensors
- Install SMS cellular remote transmitter

District meters

Consumer meters

Data Management

Transmitter Vendor Website

Sensor Transmitter

Flow and Pressure Monitoring Equipment

Manual Data Processing

Two Parameters   at 15 min reporting = 70,000 data point per year

Data Portal from Datalogger Vendor Website

- It is cumbersome and time consuming for utility personnel to retrieve data from several vendor sites and SCADA and be able to process and analyze the data so that it can be available in a meaningful format and in an effective and timely manner.

- Therefore, it is important that all data from multiple vendors and sources be integrated, automated, processed, and analyzed to generate custom-made daily reports and KPI's.

Existing Application Programming Interface

Data

SERVER

Smart Water Analytics

Electronic Reports and Dashboards

Analytics

Field Crew Access to Reports

Calibration Data

Transmitter Vendor Website

Sensor Transmitter

Sensors

Flow and Pressure Monitoring Equipment

Between 80 and 100 PSI
Between 100 and 120 PSI
Between 120 and 150 PSI
Between 150 and 200 PSI

Hydraulic Models

Examples of Data of DMA Data Automation Projects

Utility 1 – North America

- ~300,000 Customers
- SWITLink DMA Pilot – AMI, Pressure, Water Quality and Wastewater
- Daily Water Balance
- Monthly Water Balance and Report

QuickSight   arniellae@smartwateran...   arniellae@smartwateran...

Undo   Redo   Reset   ⭐ Gwinnett Daily and Monthly Analysis   Export   Data   Reports   View   Alerts

DASHBOARD No 1 (Monthly)   **DASHBOARD No 2 (Daily)**   DASHBOARD No 2 (Daily - LIVE)   Customer Meters

Controls   **Date between** Tue May 01 20...

Water Supplied	Water Consumed	Water Loss	Min Night Consumption	Active Connections	Min Night Consumption ...
87,680 gpd	**83,359 gpd**	**4,321 gpd**	**999 gph**	**495**	**2.02 gph**

DMA WATER SUPPLIED AND CONSUMED, Gallons

● DMA NRW gallons   ● DMA Flow   ● Customers Usage

Date (Minute)

Average Daily Consumption per Connection

Average Gallons/Connection

Date (Hour)

DMA DATA

RESERVED FOR OTHER KPIs

1.5

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Summary of Water Quality Parameters

Constituent	Desirable Range	Maximum	Average	Minimum
ATI Conductivity, µS	20 to 500	85.8	83.3	81.1
Halogen Conductivity, µS	20 to 500	87.4	62.9	34.4
ATI Residual Chlorine, mg/l	0.6 to 2.5	1.6	1.5	1.3
HACH Residual Chlorine, mg/l	0.6 to 2.5	1.7	1.6	1.5
Halogen Residual Chlorine , mg/l	0.6 to 2.5	1.8	1.7	1.2
Halogen Temperature , °F	50 t0 80	68.8	68.0	67.4
ATI pH, in pH units	6.5 to 8.2	7.3	7.2	7.0
Halogen pH, in pH units	6.5 to 8.2	7.1	6.8	6.4

Conductivity
Wednesday, June 15, 2022

- ATI Conductivity (uS)
- Halogen Conductivity (uS)

Residual Clorine
Wednesday, June 15, 2022

- ATI Residual Chlorine, mg/l
- HACH Residual Chlorine, mg/l
- Halogen Residual Chlorine , mg/l

pH
Wednesday, June 15, 2022

- ATI Ph Probe (pH)
- Halogen Ph (pH)

Temperature (°F)
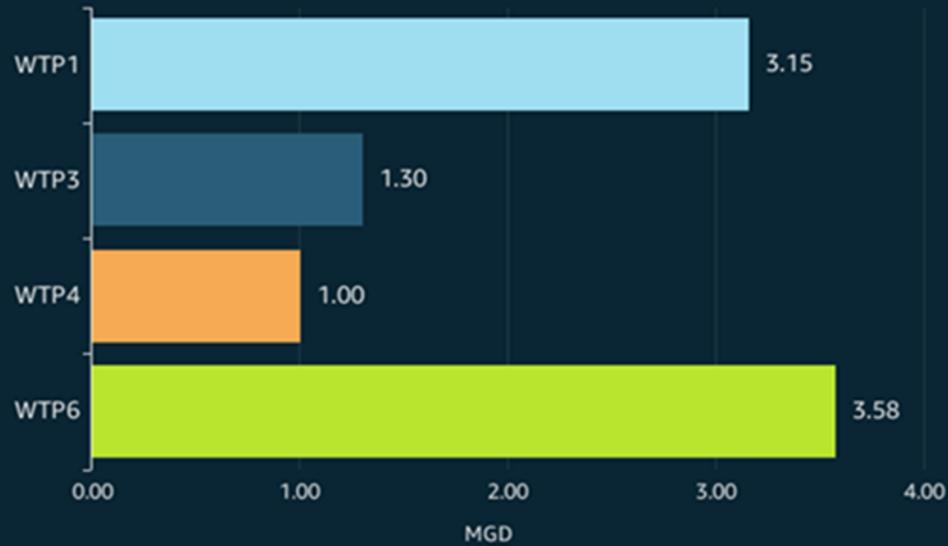Wednesday, June 15, 2022
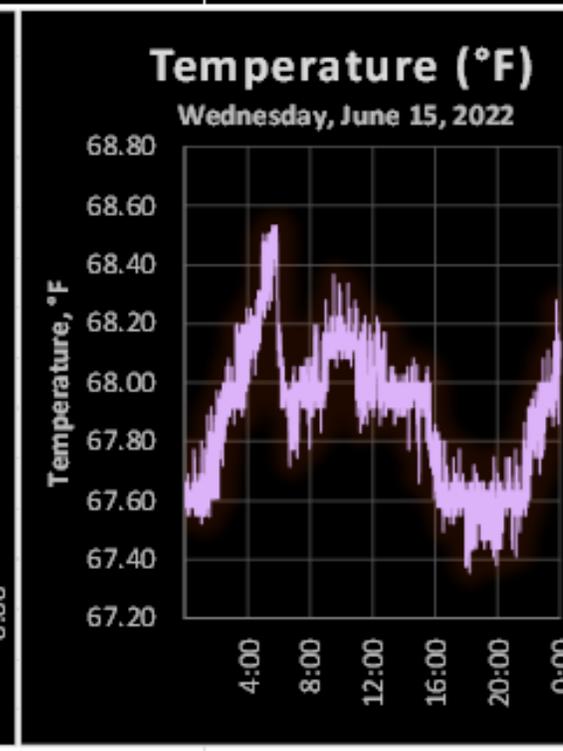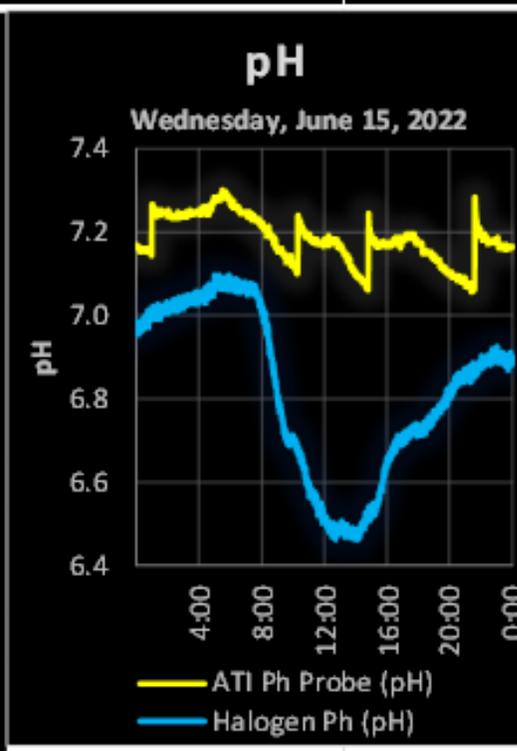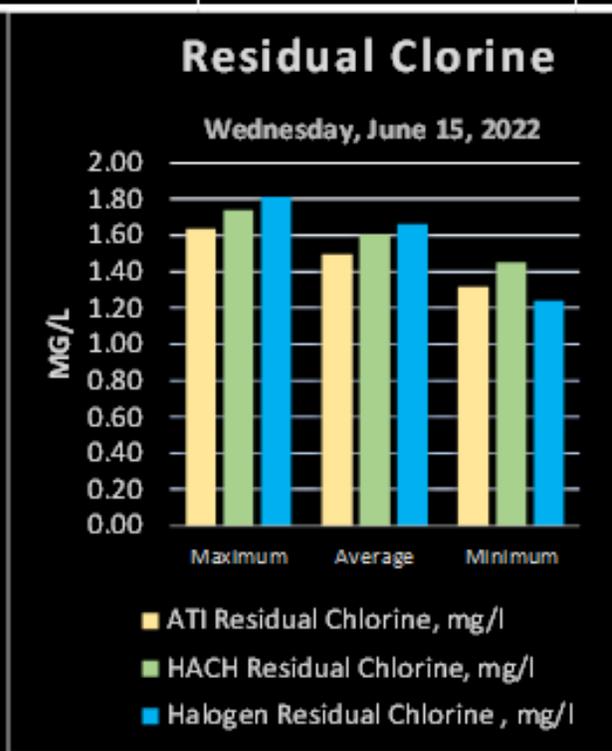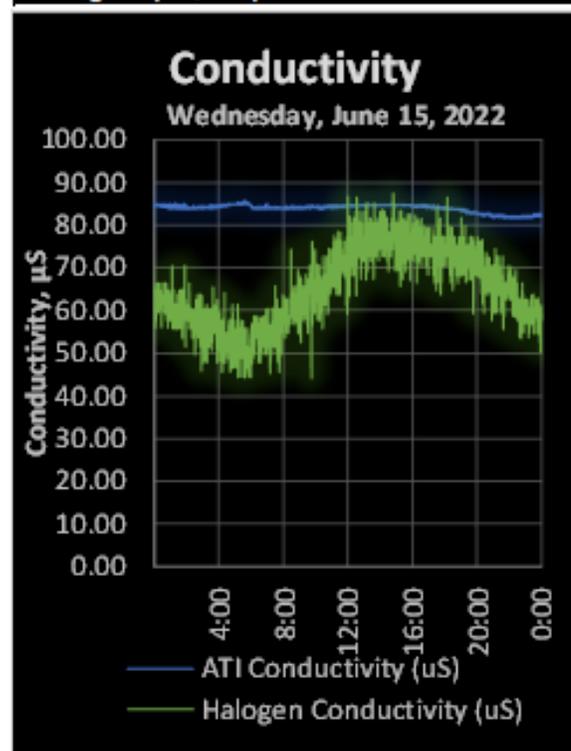
Utility 2 – Caribbean

- 12,000 Customers
- Groundwater supply with over 200 wells
- Converting to SMART AMR METERS
- High NRW
- Recently Installed DMAs
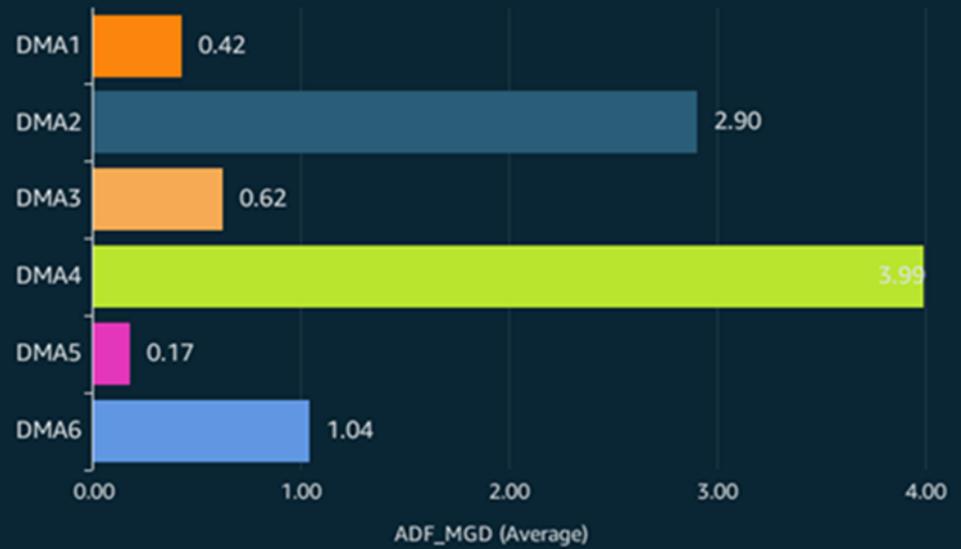- Implemented PM using VFDs
- Ongoing SCADA installation

Summary

- Developing DMAs require proper planning and smart tools like GIS and Hydraulic Models.

- Area must be isolated or if there are outflow, like in cascading DMAs, those also must be measured

Basic Water Balance: Water Loss = Inflow - (outflow + measured consumption)

It is time consuming for utility personnel to retrieve data from several vendor sites and SCADA and be able to process and analyze the data so that it can be available in a meaningful format and in an effective and timely manner.
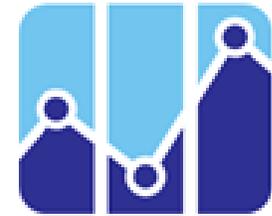
Therefore, it is important that all data from multiple vendors and sources be integrated, automated, processed, and analyzed to generate custom-made daily reports and KPI's.

Questions ?

THANK YOU !

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