



FIG WORKING WEEK 2023

28 May - 1 June 2023 Orlando Florida USA

Protecting
Our World,
Conquering
New Frontiers

The Ghana Water Transformation Journey

A brief story about the impact of
geospatial technology in the growth of
urban water supply in Ghana

Kwaku Nyarko-Dokyi, MSc. MGhIS

Technology & Innovation Department
Ghana Water Company Limited

Co-authors : Michael Nyoagbe, MSc. MGhIS

: Maxwell Akosah-Kusi, MSc. MGhIE

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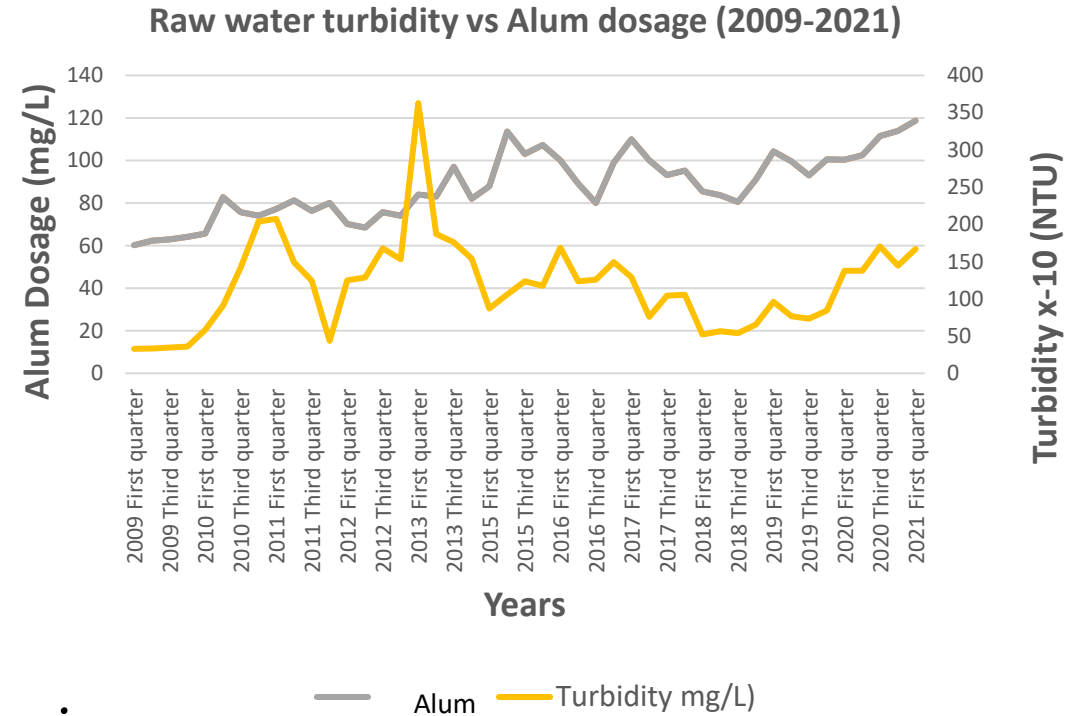


Justification

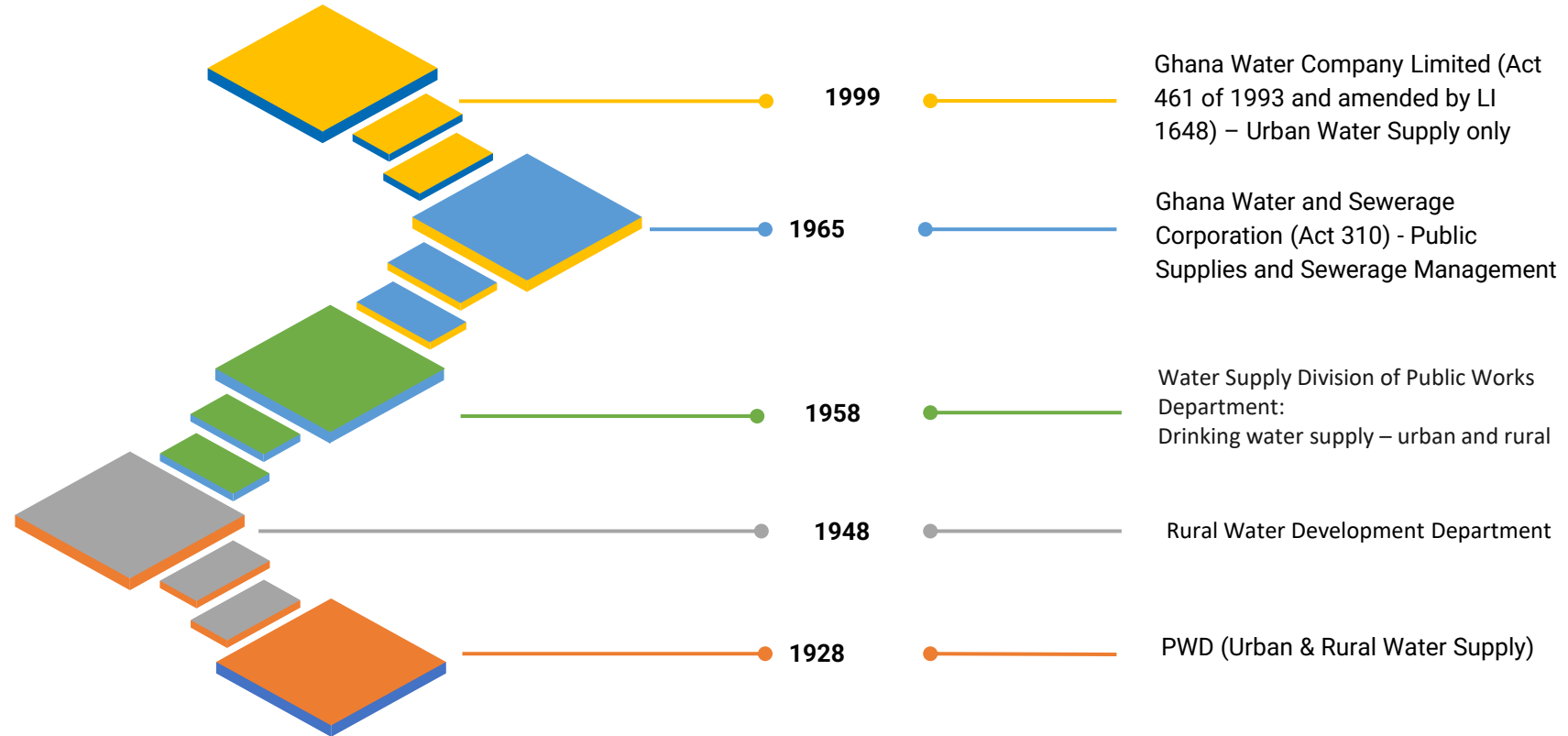
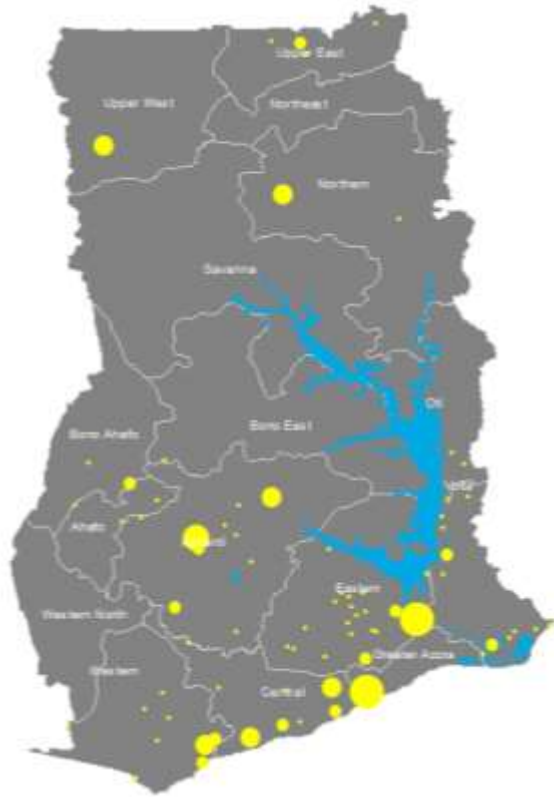


Challenges faced by GWLC include:

- Raw Water Pollution (illegal alluvial mining)
- Managing huge network of discrete systems
- High Non-Revenue Water
- Operational Efficiency
- Lack of modern systems to manage commercial business.



GWCL Profile



GWCL Profile:



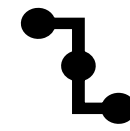
91

Urban Water Systems



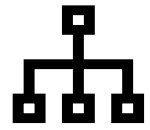
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Million m³ of clean water per year



900,000

Customer Connections



13,500

Kilometers of Network Infrastructure



5,000

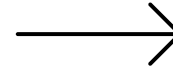
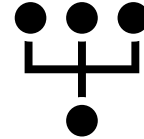
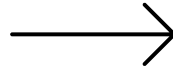
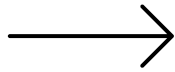
Staff



43%

Non-revenue water

The GWCL Business Process:



Abstraction & Treatment of raw water from both surface and ground water sources

Treated water **Transported** through relatively larger transmission networks

Treated water further **distributed** through network of mains to consumer premise

Consumers billed with applicable tariff and expected to honor delivered bills.

Notable Solutions within last decade:

1. Geospatial technology for managing WDNs and Customer Data.
2. SCADA Systems for hydraulic data acquisition and management.
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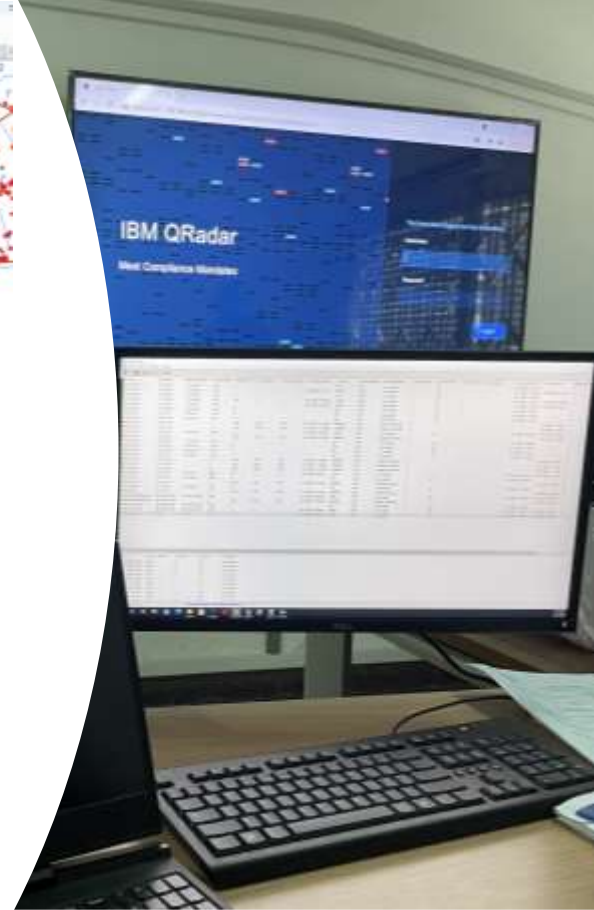
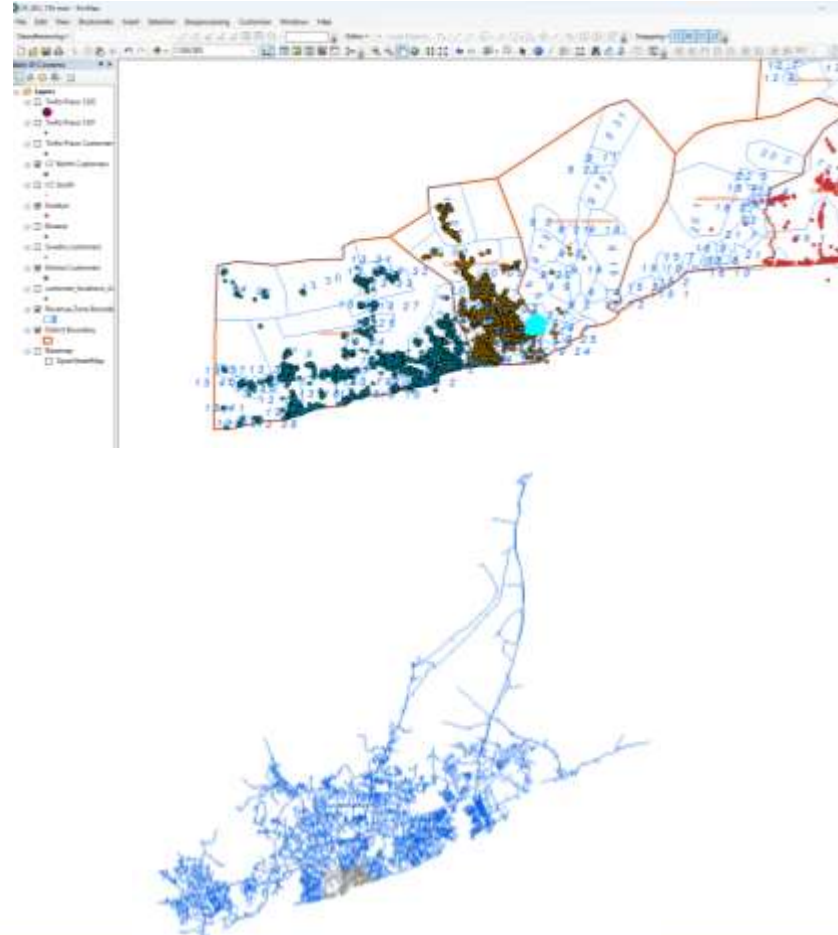


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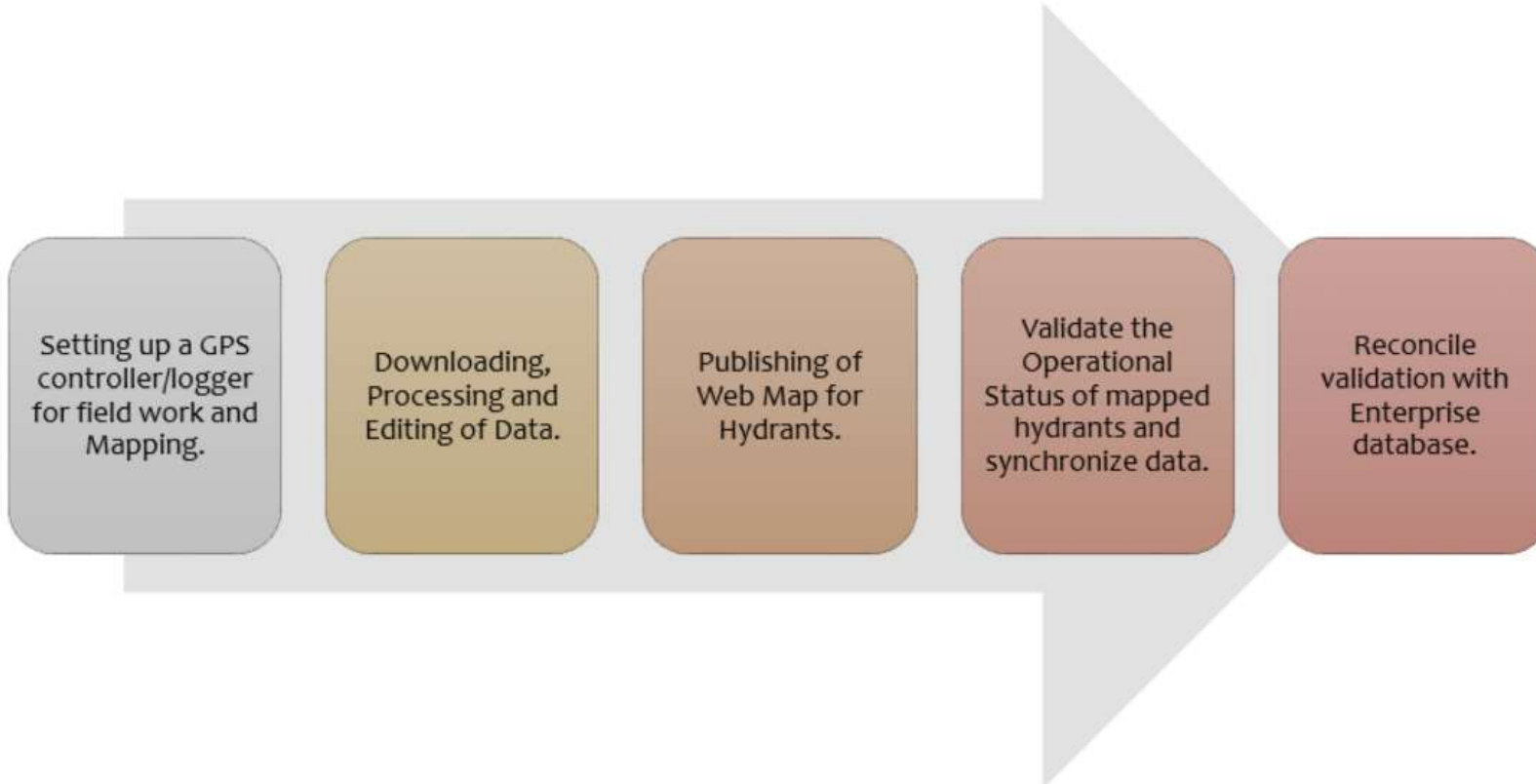


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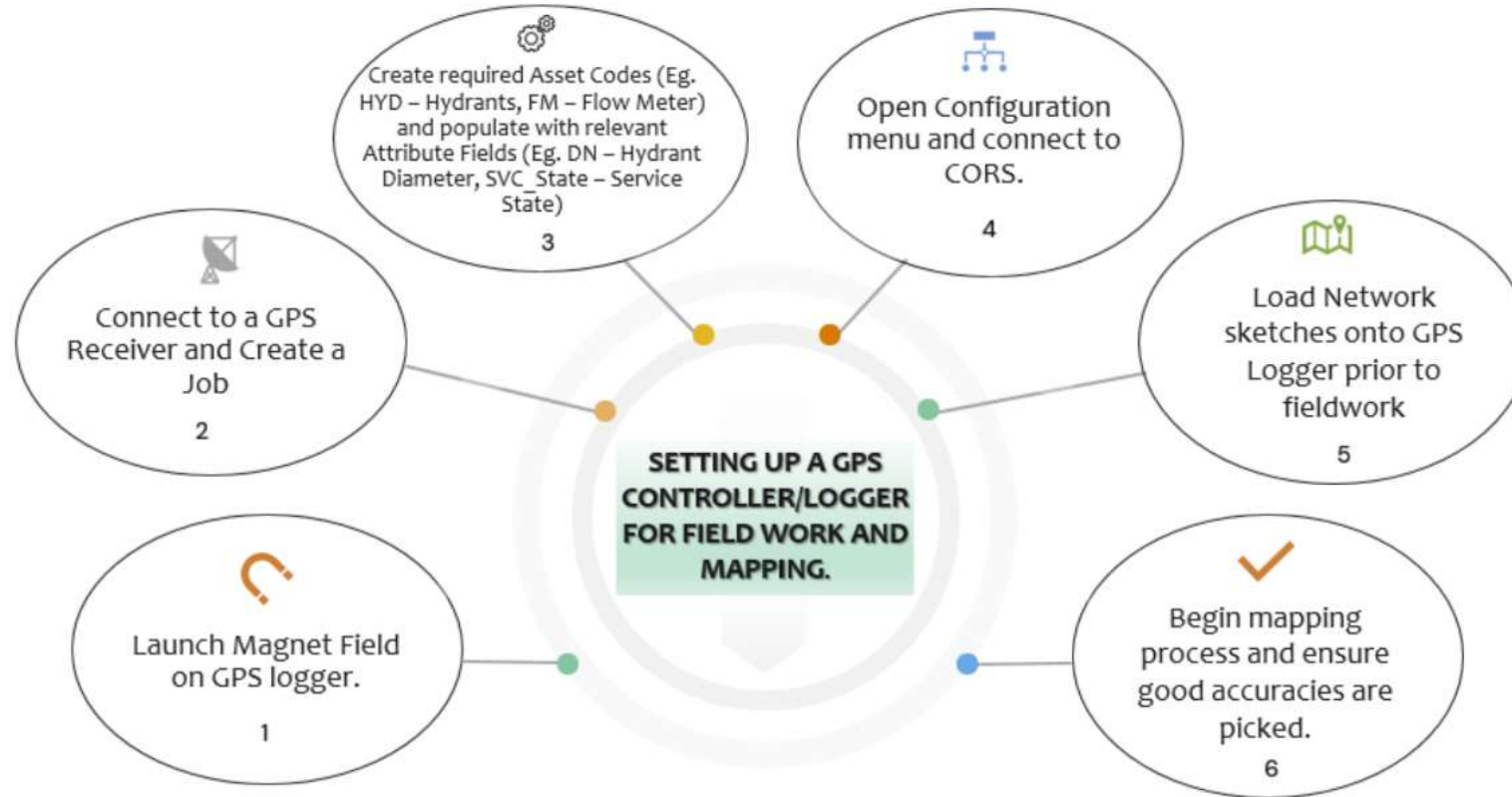


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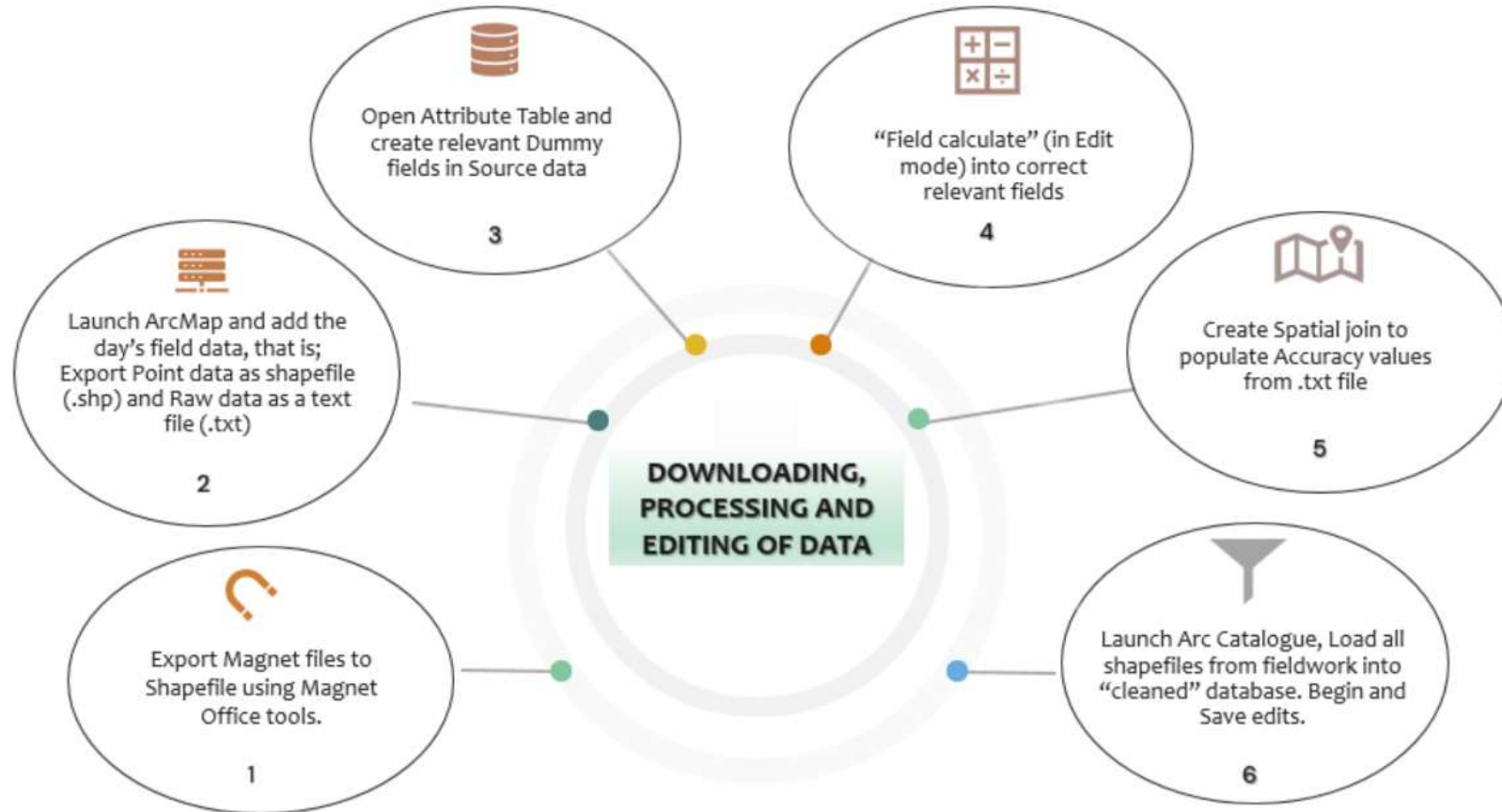


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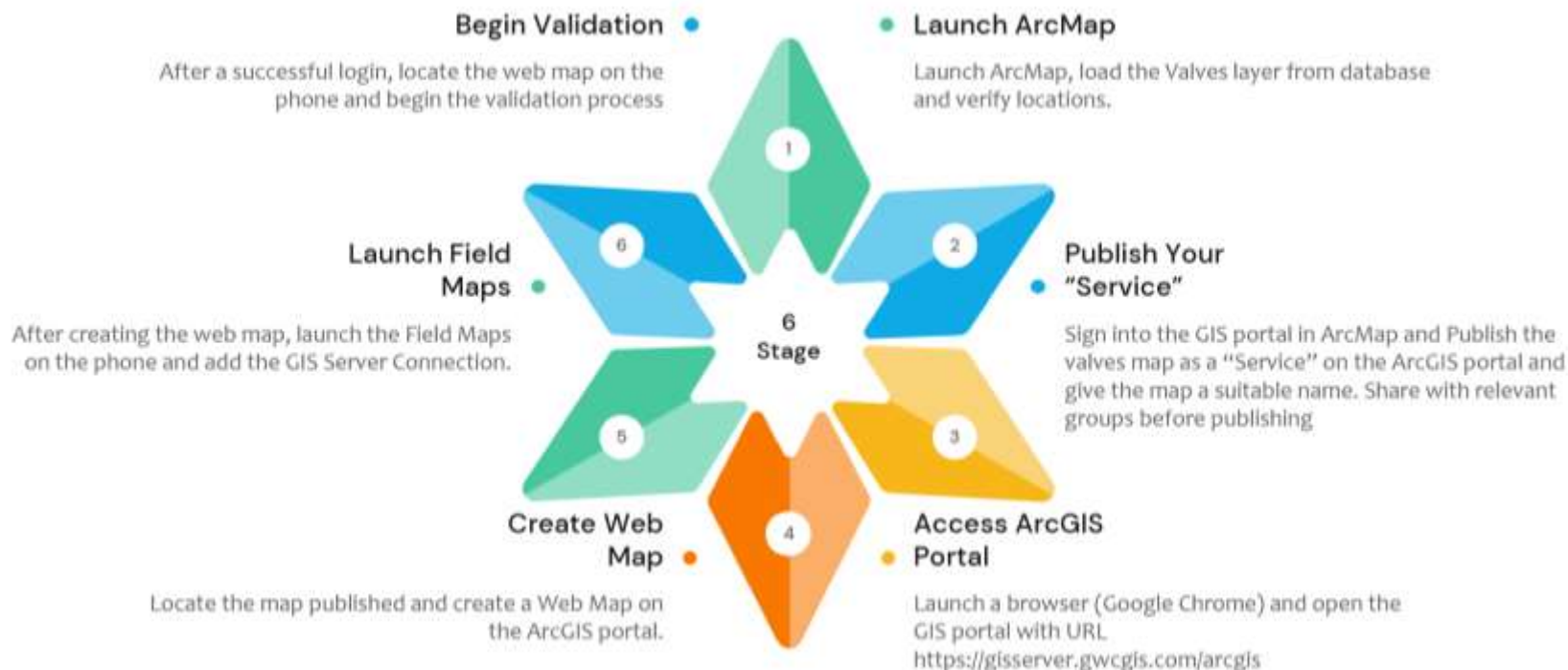


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The map is downloaded in ArcGIS package information format (.pkinfo).

In the Overview menu, click on the Open in ArcGIS Desktop drop-down arrow and choose Open in ArcMap.

Navigate to the Content menu and locate the web map and open it.

Open a browser, log in to <https://gisserver.gwccgis.com/arcgis> and sign in.



Launch the downloaded map and open the Attribute table.

Scroll to the extreme right and locate the Last Edited Date field to determine which changes have been made.

Compare the various fields with that of the Enterprise database and make the necessary change in the Enterprise database where necessary.

Data Reconciliation

Launch the downloaded map and compare attributes, mainly pipe sizes and materials, with the data on the Enterprise. The data from the bursts/leakage mapping is then used to update the data on the Enterprise.

Data Assessment & Analysis

With the dashboard, the data on the server can be represented into graphs, tables and pie charts for further appreciation. The data is downloaded from the web map in the Content menu in ArcGIS Package Information format (.pkinfo).

Syncing & Submission

The app then synchronizes with the portal/server (<https://gisserver.gwccgis.com/arcgis>) to submit the data. To access the data, open the link and login into your account. Navigate to Content menu then to Dashboard (you may have to create one for the first time)

Find the Location

From the report received, the team is able to identify the location of the burst/leakage. However, there are instances the team may have to trace the leakage by walking on the pipeline trajectory. The **mapping of the burst/leakage** begins at this stage, inputting the time the burst was reported.

Isolation & Preparation

Once the burst/leakage has been identified, all control valves are shut to minimise water loss and where as necessary without valves are opened to drain that section of water. The time for **isolation** is captured. From records (drawings) and plan knowledge, suitable materials are selected prior to the repair works.

Repair Works & Mapping

On site, carry out an excavation to expose the section. Examine the pipeline characteristics *in situ* to confirm the materials brought to site. Replace the section, pour an already prepared disinfectant into it and tighten up. The technician then **completes the mapping** by filling the remaining details and takes a picture of the work done.



Geospatial technology employed in operations:

- Asset Validation: Digitization of water distribution network.
- Valve Operational status monitoring and update.
- Pipeline maintenance.
- Leakage reporting and management.
- Integrated network modeling.
- Water quality monitoring.

Integrated Network Modeling:

- Managing and understanding hydraulic behaviour of network
- Simulate expected outcomes on extensions/amendments
- Future predictions



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DEBTORS OF CCS ROUTE 0405 (NORTH OLA) OWING ABOVE 300 GHC

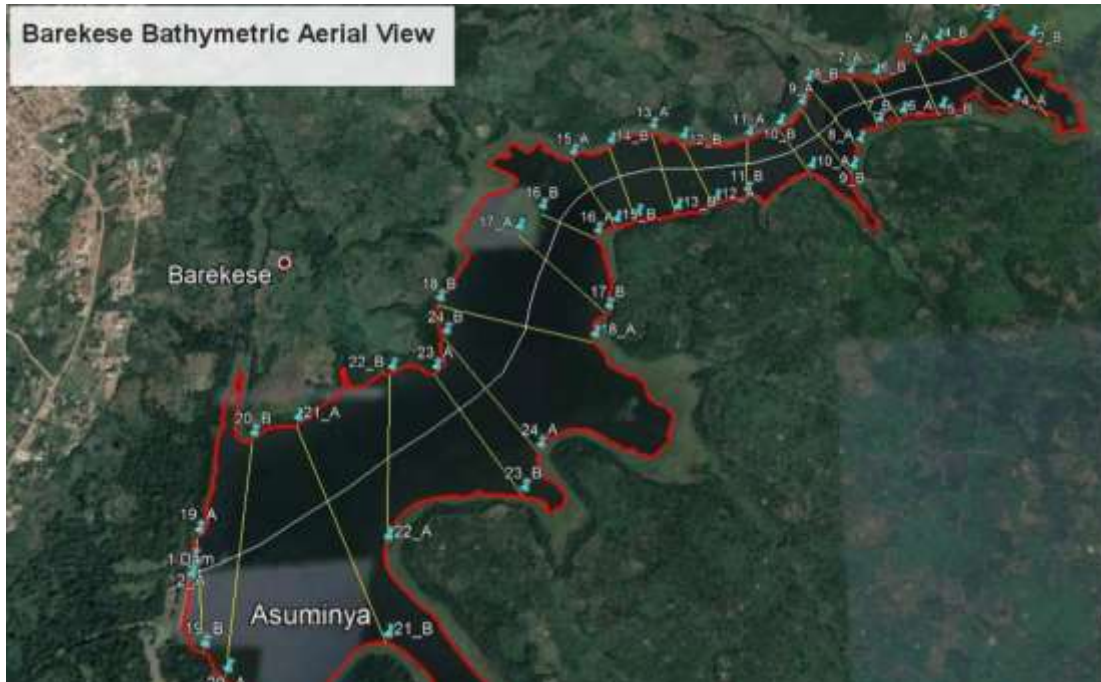


Month	Name	Value 1	Value 2	Value 3	Value 4	Value 5	Value 6	Value 7	Value 8
April	DAVIDSON JOHN MURRAY JR	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000
May	DAVIDSON JOHN MURRAY JR	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000
June	DAVIDSON JOHN MURRAY JR	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000
July	DAVIDSON JOHN MURRAY JR	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000
August	DAVIDSON JOHN MURRAY JR	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000
September	DAVIDSON JOHN MURRAY JR	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000
October	DAVIDSON JOHN MURRAY JR	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000
November	DAVIDSON JOHN MURRAY JR	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000
December	DAVIDSON JOHN MURRAY JR	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000

Some Results of Geospatial Activities (Year ending 2022):

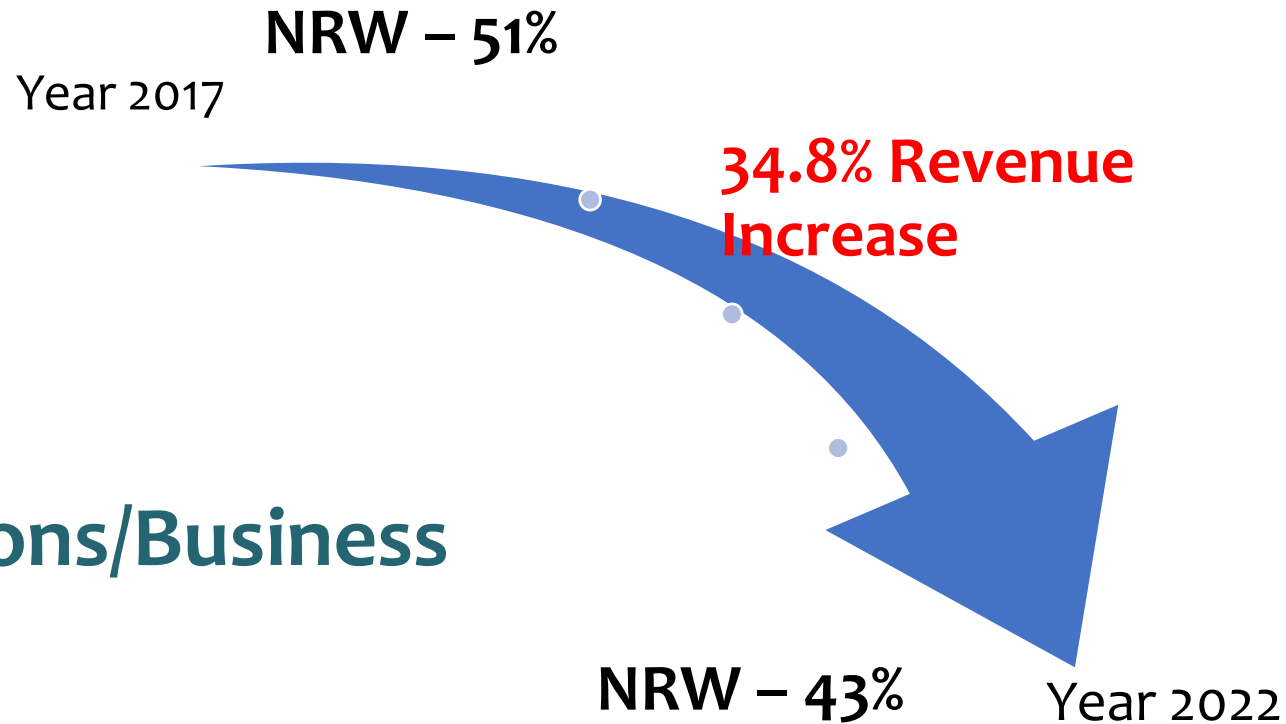
Asset	Number Mapped	Estimated Total
Pipelines (km)	11,340	13,500
Valves (Nr.)	9,819	
Hydrants (Nr.)	1,349	
Customer Locations (Nr.)	854,496	
Water Quality Sampling Locations (Nr.)	15,596	

Other Geospatial Opportunities:



Conclusion:

Impact on Operations/Business



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