



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

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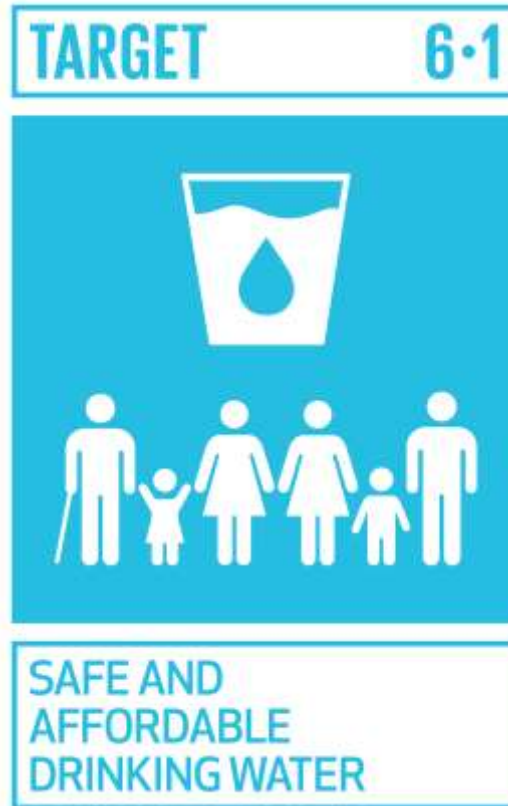
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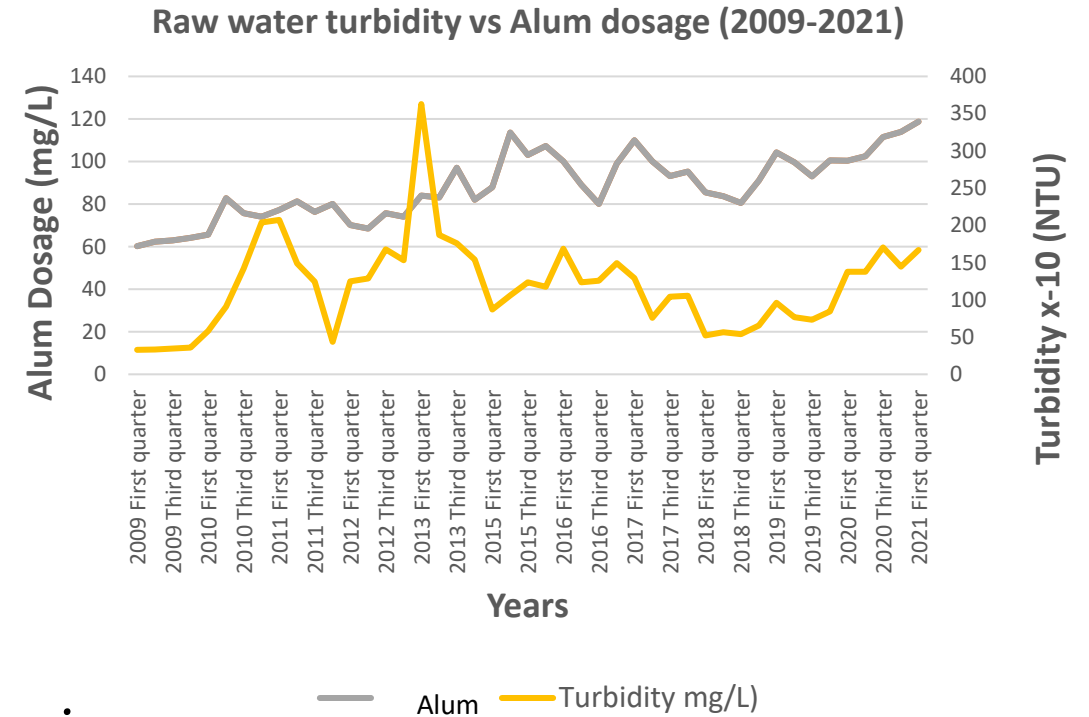


Justification

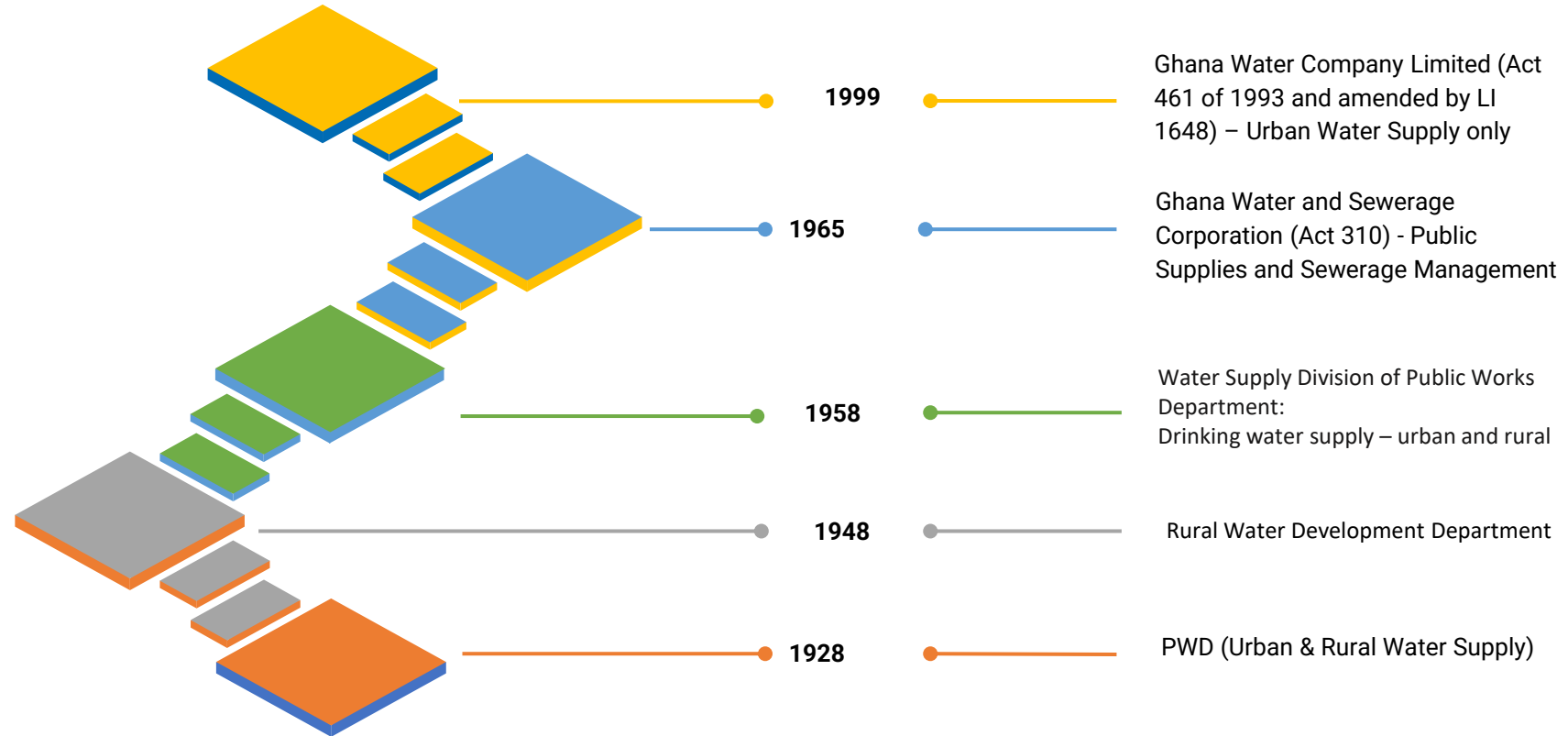
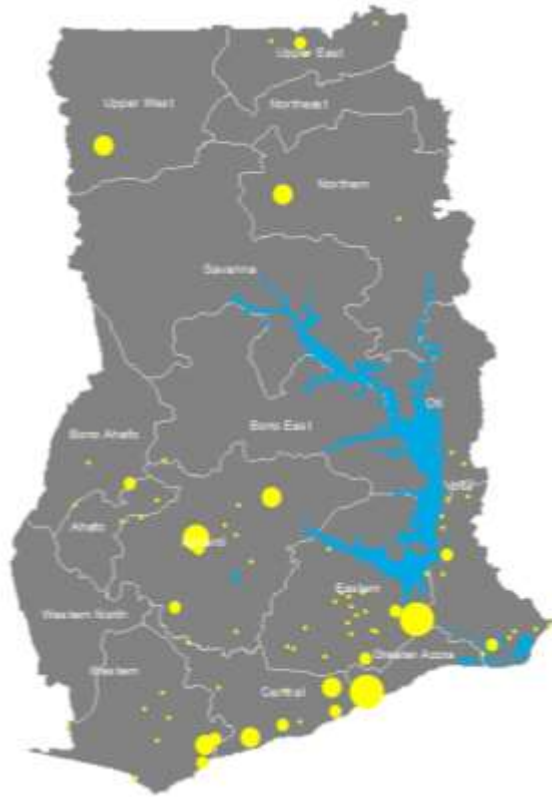


Challenges faced by GWLC include:

- 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:



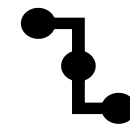
91

Urban Water Systems



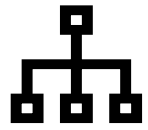
320

Million m³ of clean water per year



900,000

Customer Connections



13,500

Kilometers of Network Infrastructure



5,000

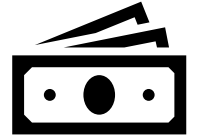
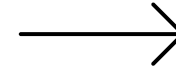
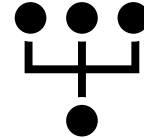
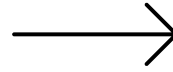
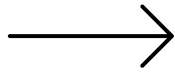
Staff



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.
3. Development of Customer Based System for managing Meter Reading, Billing and Collection.

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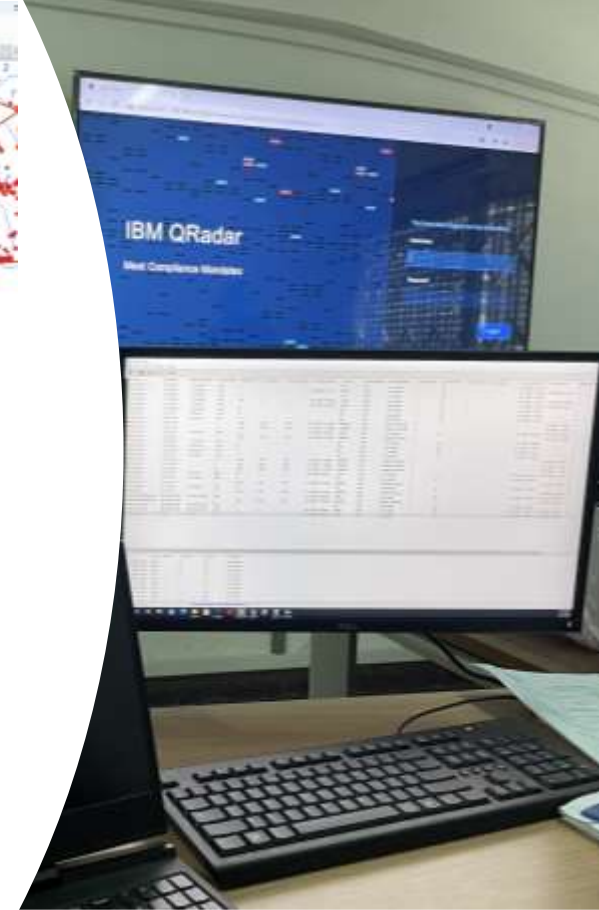
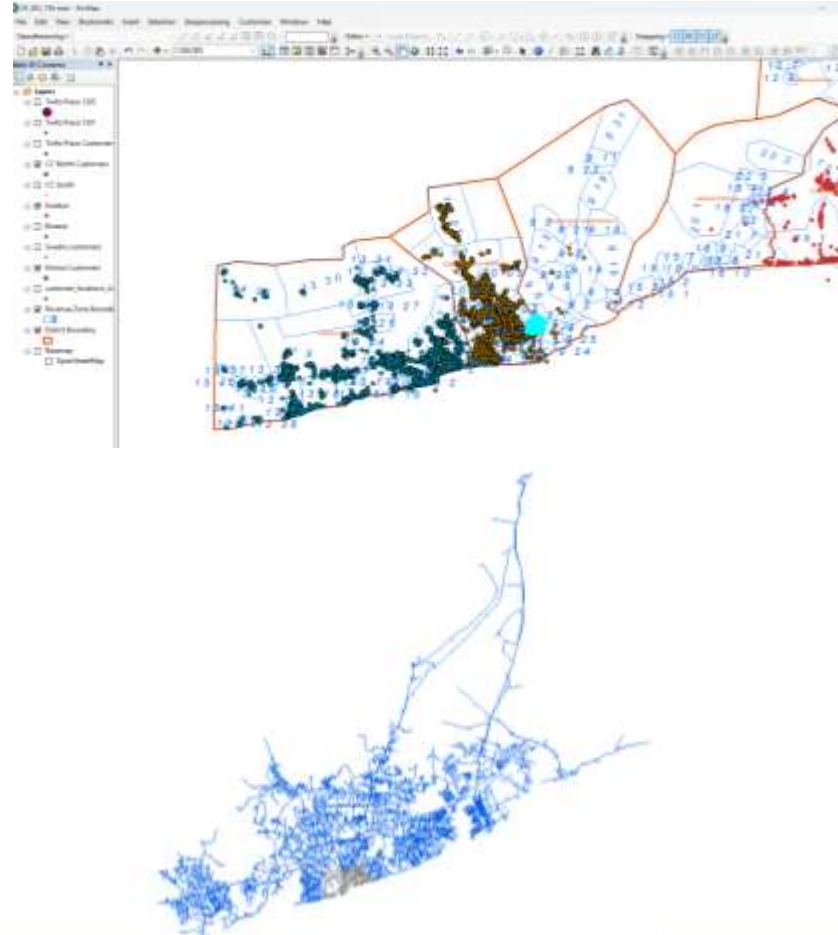


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Setting up a GPS controller/logger for field work and Mapping.

Downloading, Processing and Editing of Data.

Publishing of Web Map for Hydrants.

Validate the Operational Status of mapped hydrants and synchronize data.

Reconcile validation with Enterprise database.

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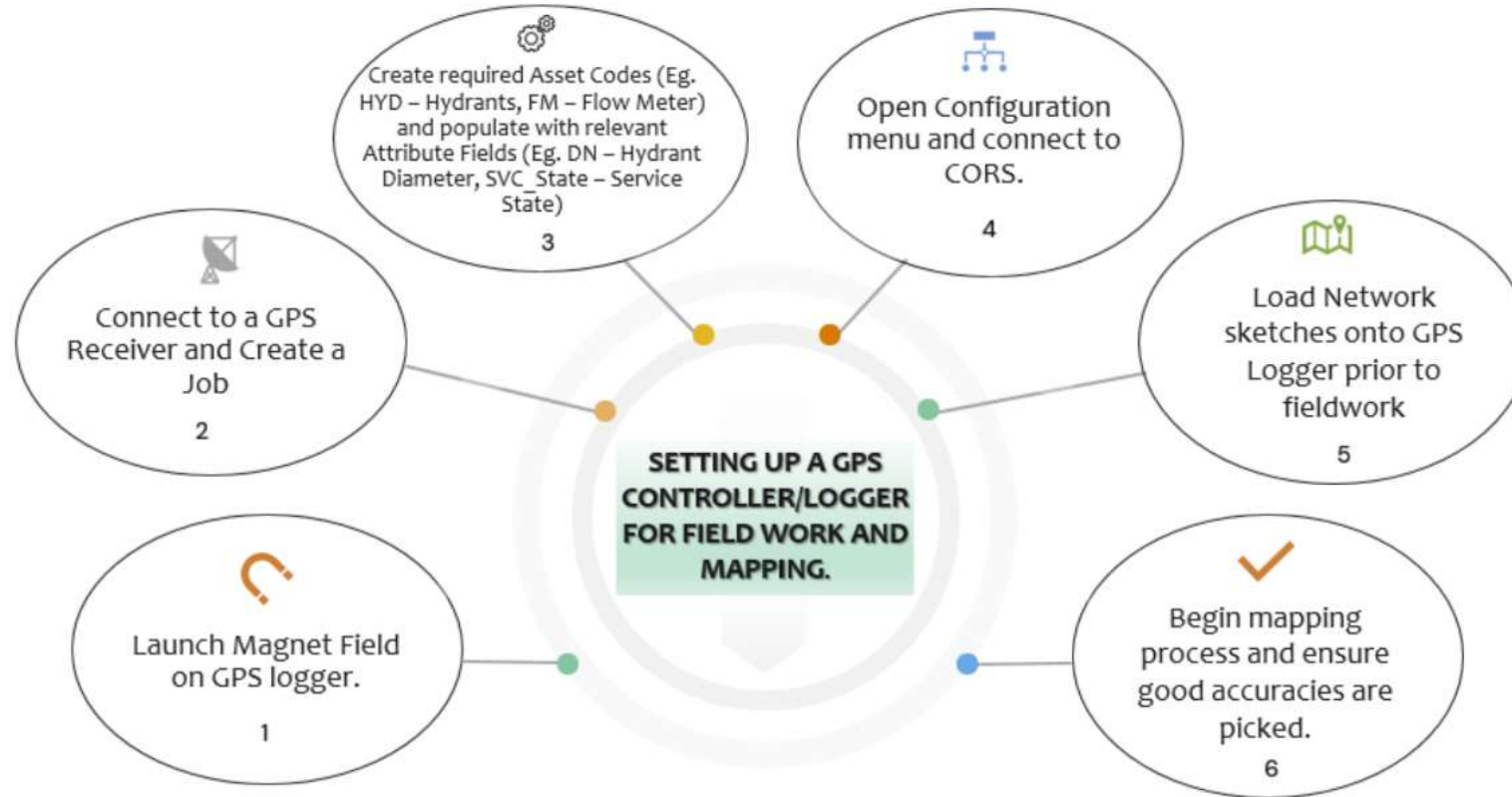


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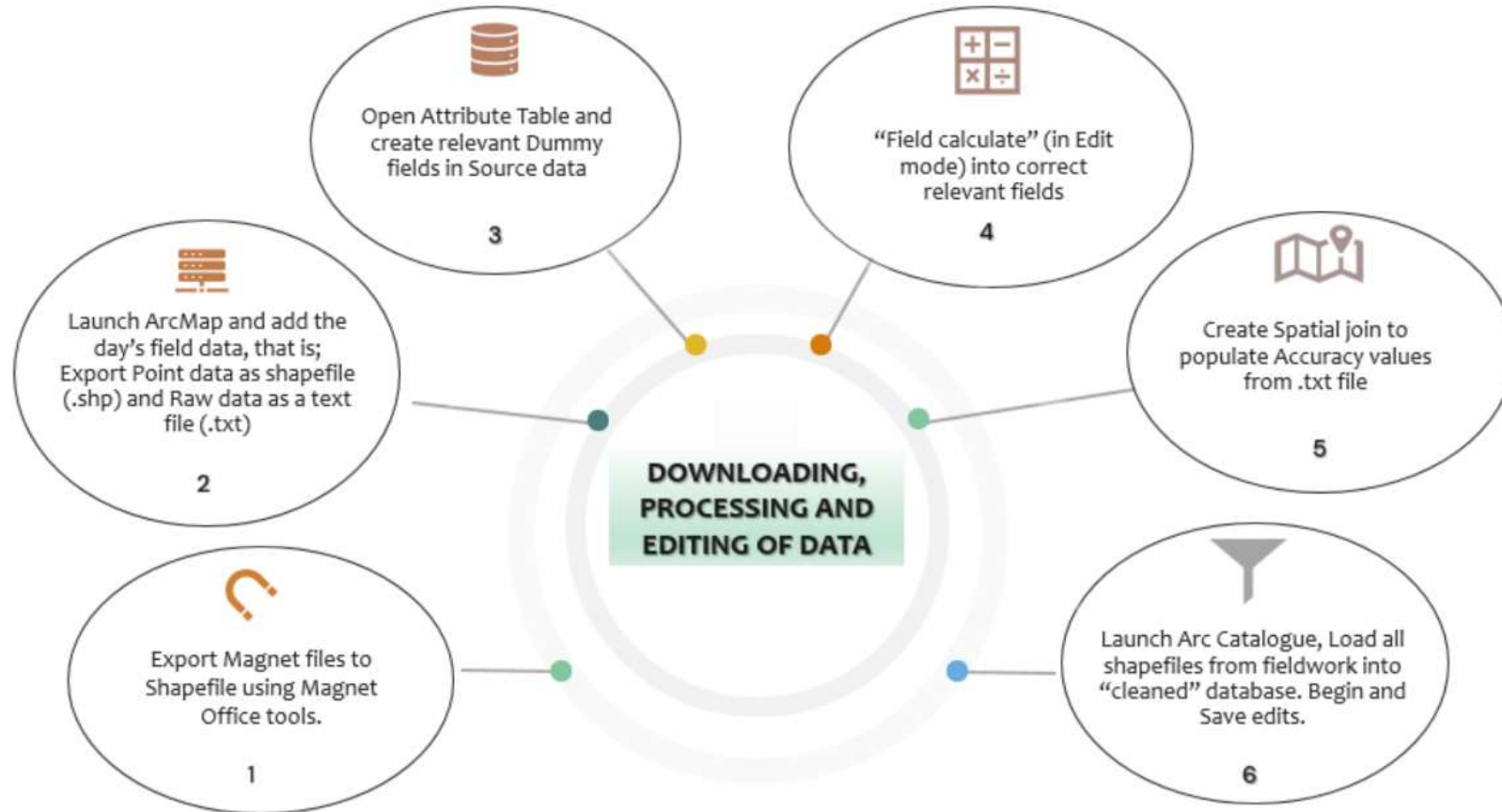


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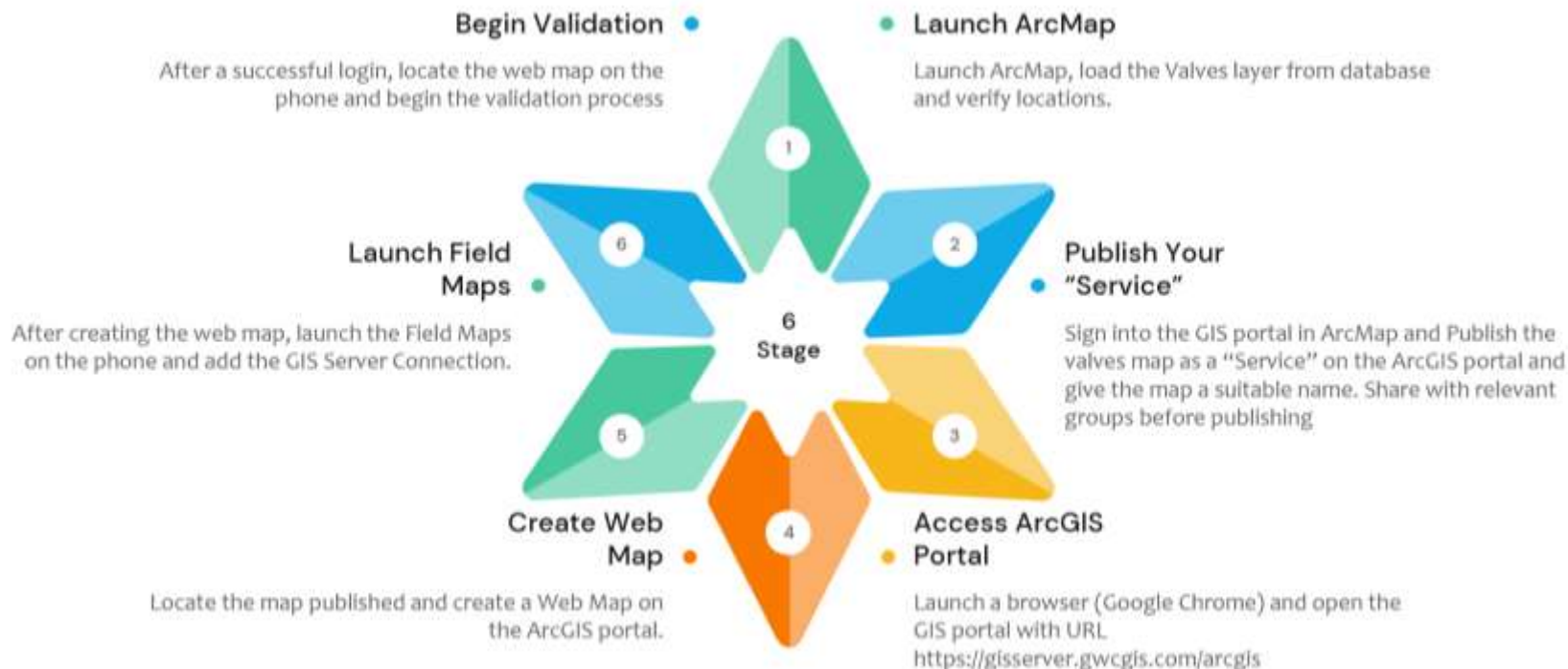


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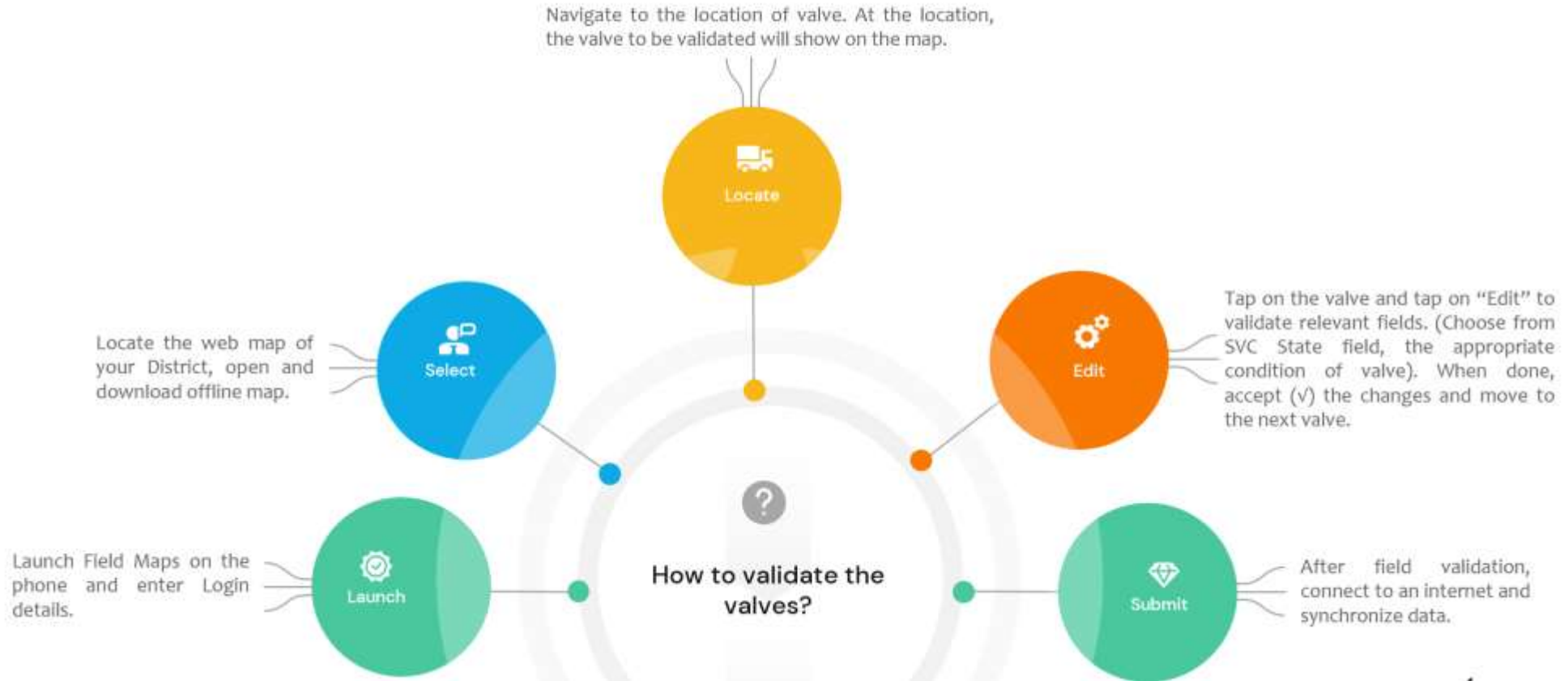


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The map is downloaded in ArcGIS package information format (.pkinfo).



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).



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.

Syncing & Submission

The app then synchronises 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)

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



Notable Solutions within last decade:

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



Search Fields Management

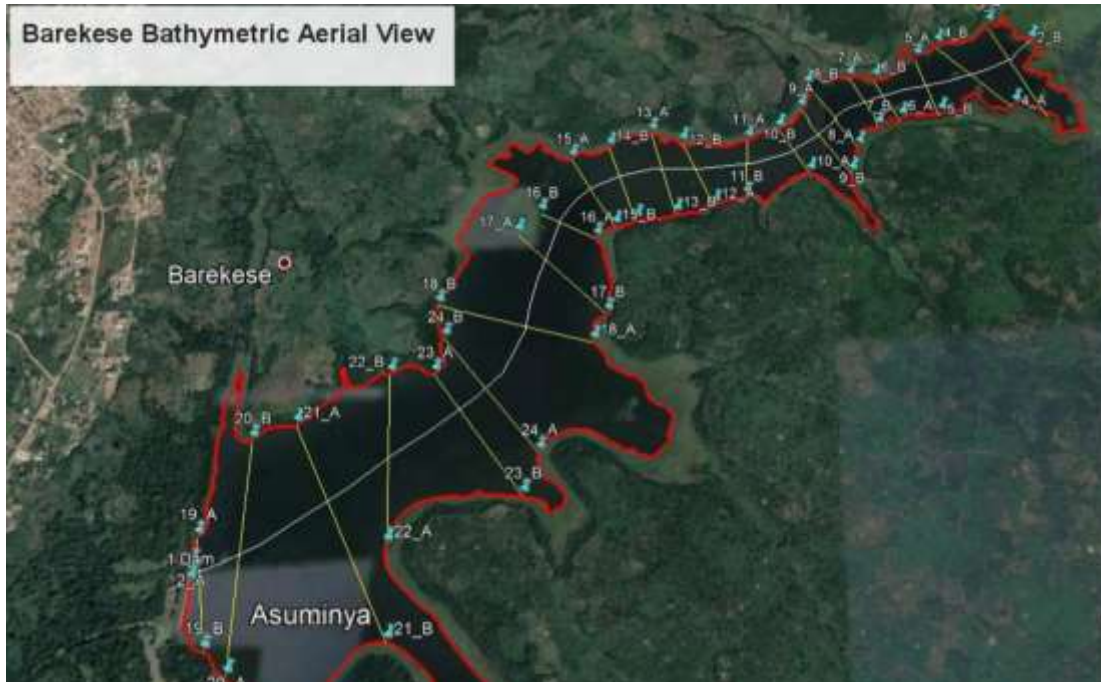
Region: CENTRAL
Customer Category: DOMESTIC UNMETERED (M1)
Account Number(s):
Start Date: 2019
End Date: September 2019
Queue: BODACE
Alarm Status: Working Alarm
Project Type: Unmetered Billing Project
Cost Consumption: 9 Alarms 8 Events 0 Detours
Billing Cycle: Capex Mth
Billing Start: 0
Billing Conditions Only: 0
Multiplier: 1.0
GPS Method: GPS Method
Commission and Councils: COMMISSIONS AND COUNCILS

Month	Count	Value	Value	Value	Value	Value	Value	Value	Value
April	1	1,170	1,170	0	1,170,000	1,170	1,170	1,170	1,170
May	1	40	40	0	1,170,000	1,170	1,170	1,170	1,170
June	1	40	40	0	1,170,000	1,170	1,170	1,170	1,170
July	1	12	124	0	1,170,000	1,170	1,170	1,170	1,170
August	1	104	104	0	1,170,000	1,170	1,170	1,170	1,170
September	1	1,170	1,170	0	1,170,000	1,170	1,170	1,170	1,170
October	1	10	10	0	1,170,000	1,170	1,170	1,170	1,170
November	1	104	104	0	1,170,000	1,170	1,170	1,170	1,170
December	1	400	400	0	1,170,000	1,170	1,170	1,170	1,170

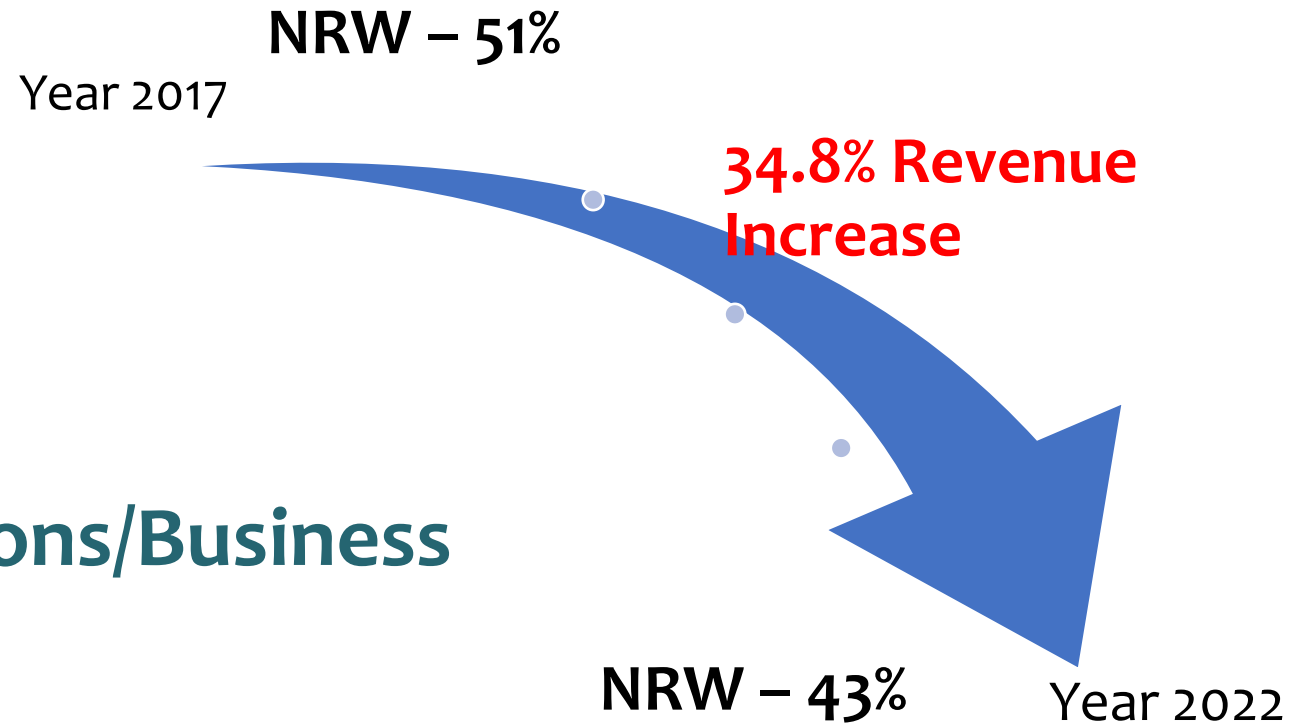
Some Results of Geospatial Activities (Year ending 2022):

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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