

## CASE STUDY

# Connecting water data to support more proactive infrastructure management in Cape Town

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How the City of Cape Town's Water & Sanitation Directorate used data reconciliation and advanced analytics to improve infrastructure visibility, reduce manual work, and reduce water losses through early leak detection.



# At a glance

## MUNICIPALITY

City of Cape Town

## DIRECTORATE

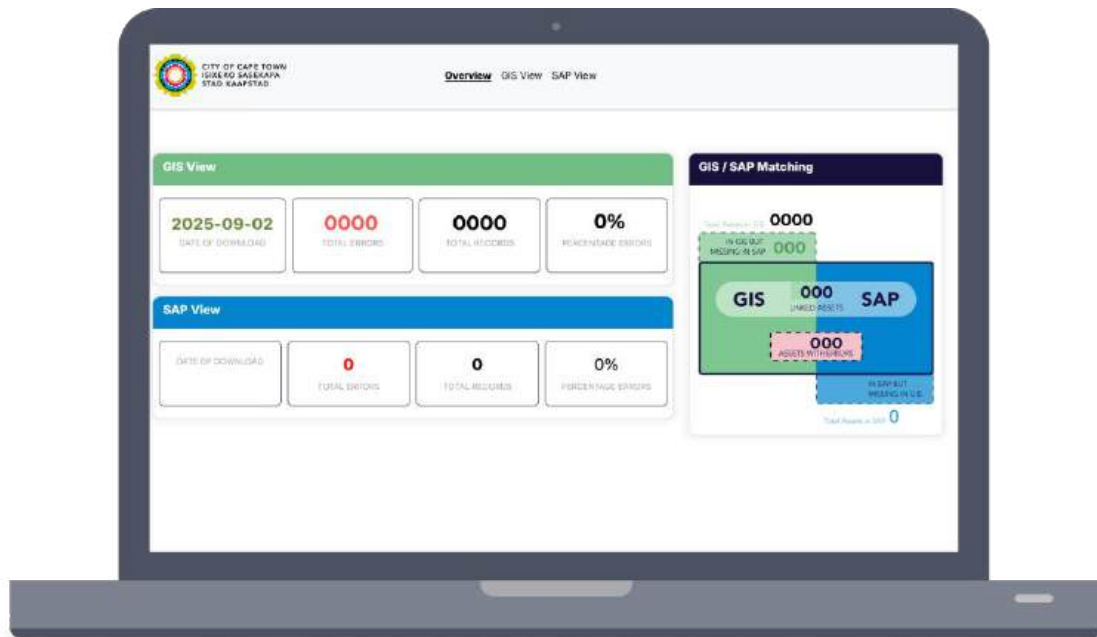
Water & Sanitation Directorate

## TOOL

W&S Asset Matching Dashboard; W&S Advanced Zone Management Analytics Dashboard

## PRIMARY USERS

Water & Sanitation officials, GIS teams, SAP Plant Maintenance users, Water Demand Management, Technical Operations, Bulk Water, Data Science Unit, data management teams and related W&S officials



## At a glance



### THE CHALLENGE

Water infrastructure teams need accurate, joined-up information to inspect, maintain, monitor and manage infrastructure proactively, but fragmented systems and manual analysis made this difficult.

### KEY RESULT

Asset records in SAP and GIS did not always match, while sensor and monitoring data for pressure managed zones was spread across different platforms, with no consolidated operational view.

### MAIN LESSON

The dashboards improved visibility across infrastructure records and pressure zone performance, reduced manual reconciliation and analysis, and supported stronger coordination between teams. This allows water leaks to be detected weeks sooner than they had been.

## Context



This work was supported through a strategic partnership between the UK Foreign, Commonwealth & Development Office, the City of Cape Town, and Open Cities Lab, building on foundations laid through the Future Cities Programme South Africa and the Urban Resilience Programme.

The programme focused on a practical question: how can existing municipal data be brought together to help officials manage water infrastructure more proactively?

The two use cases respond to different parts of that challenge. One focuses on improving the quality and alignment of infrastructure records. The other focuses on making operational monitoring data easier to see and interpret.

Together, the tools show how municipal digital transformation can build from the systems, data and expertise already inside the City. Rather than introducing standalone tools from outside the municipality, the work focused on making existing information more connected, visible and usable for officials responsible for maintaining essential water services.

This was supported by the City of Cape Town's broader data environment, including a centralised data strategy, internal data capacity, data governance structures and cross-departmental collaboration.

# The challenge



Water loss is a major priority in South African cities, especially Cape Town, where drought conditions have heightened the need to protect water availability. Due to disparate data systems, delays were leading to some missed asset inspections and missed leaks - resulting in sub-optimal water management.

For asset management, records in SAP and GIS did not always align. Some assets appeared in one system but not the other, while others were duplicated, missing or recorded inconsistently. This created uncertainty about whether all assets were properly linked to inspection and maintenance workflows.

For pressure zone management, sensor and monitoring data existed, but it was spread across different platforms and required manual analysis. Without a consolidated view, teams could not easily see where pressure issues, anomalies or possible water losses were emerging.

Across both use cases, the issue was not a lack of data. It was that existing data was not yet connected, trusted and usable enough to support quick, shared operational decision-making. This challenge is not unique to the City of Cape Town - however, the City of Cape Town had the internal conditions to be able to resolve it.

# The solution

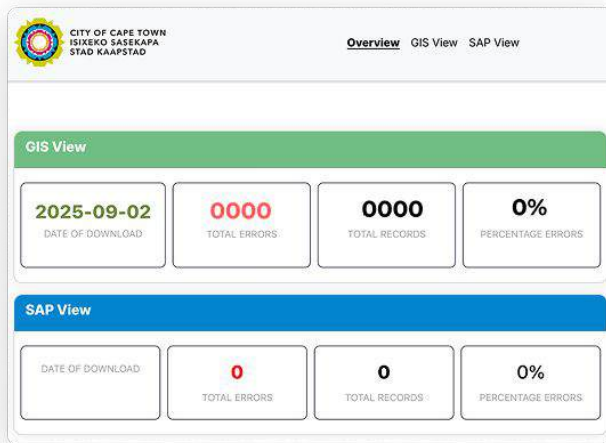
## Advanced Zone Management Analytics Dashboard

The Advanced Zone Management Analytics Dashboard helps the City monitor pressure managed zones more proactively.

The tool supports officials to:

- bring together data from different sensors and systems;
- monitor more than one hundred pressure managed zones;
- identify anomalies in water flow and pressure;
- flag possible water losses or compromised zone integrity;
- identify missing or questionable data;
- reduce the need for manual calculations;
- support more coordinated interpretation across W&S teams.

Instead of requiring officials to manually compare data across systems, the dashboard provides a centralised view of zone performance. This helps teams move from delayed, manual analysis towards earlier detection of possible problems and a more proactive approach to water infrastructure monitoring.



**Figure 1:** Spatial representation of the 2011 Socio-Economic Vulnerability Index (SEVI)

# What changed

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Together, the dashboards created clearer and more actionable views of water infrastructure data.

## A clearer view across systems

The Asset Matching Dashboard turned hidden data mismatches into visible issues that officials could investigate and correct. This gave teams a quicker way to identify missing, duplicated or inconsistent records before they affected inspection and maintenance workflows. This matters because missing or incorrect records can affect whether inspection or maintenance work orders are generated against specific assets.



*Someone will say, oh, there's an asset that's on GIS, but it's not on SAP. And as a result, there haven't been inspection work orders issued against that asset. And as a result, we haven't been inspecting it. Now we will start inspecting it.*

— City of Cape Town Water & Sanitation official

# What changed

## A clearer view of anomalies and water losses

The Advanced Zone Management Analytics Dashboard made pressure zone anomalies easier to see and investigate. This gives teams a quicker way to identify possible water losses and understand where zone integrity may have been compromised. This is important because earlier detection can support faster investigation and response, rather than waiting for issues to appear through slower reporting cycles.



*So I think it's a very powerful 'one stop shop' to pick up those anomalies to see where zone discreteness is lost. And then to also enable us to hopefully activate action quicker than we previously had done before, instead of only picking it up one or two months later, which is obviously not ideal.*

— City of Cape Town Water & Sanitation official

# What changed

## Improved operational capacity

By automating part of the reconciliation process, the Asset Matching Dashboard has helped reduce manual work and free up capacity for more strategic tasks. The solution automated a specific manual process in a way that freed up one full staff role for strategic work. This is an important early signal of efficiency and productivity gain.

## Stronger coordination between teams

Both use cases supported better coordination between teams responsible for different parts of the water infrastructure environment.

The Asset Matching Dashboard provides a shared view that can help GIS, SAP, Water & Sanitation, and data teams work from the same evidence base. This is important in municipal environments where infrastructure data is often distributed across departments and platforms.



*The existence of this tool enhances [the city's] ability to work across different systems... There's really better coherency between the systems... [and] our management of our assets is more coordinated.*

— City of Cape Town Data Science official

## What changed

The Advanced Zone Management Analytics Dashboard also supported better collaboration between W&S teams that work with different parts of the water infrastructure system.



*So it actually has improved cross collaboration and interaction between the different units. I think during the process, we've obviously improved how we interact and engage with each other, also understanding how each of us analyse and need to use the data.*

— City of Cape Town Water & Sanitation official

### Early adoption, with further integration planned

Both dashboards have been developed and deployed, but are still being embedded into standard operating processes.

The Advanced Zone Management Analytics Dashboard is currently being used on an ad hoc basis to test functionality, validate outputs and compare automated analysis with existing manual calculations.

# What changed

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This evidence suggests that the City is moving towards more coherent and proactive water infrastructure management. While the tools are still being embedded, they have already helped make asset records, data quality issues and pressure zone performance easier to see, test and discuss.



*Currently using it on an ad hoc basis, but in future, we will use it to make decisions and use it regularly.*

*— City of Cape Town Water Data management official*

# Equity, inclusion, and public value



Both dashboards have an important public value dimension because water infrastructure reliability affects residents across the city.

Both use cases included a preliminary GESI lens, similar to the [Electricity Asset Management work](#). The team considered water asset management distribution in socio-economically vulnerable areas and how improved data visibility could support better services in those locations.

This matters because infrastructure data tools should not only improve internal efficiency. They should also help municipalities understand whether maintenance gaps, data gaps, pressure issues or infrastructure risks may affect residents differently.

The equity impact of these specific tools is still emerging, but the direction is important. More complete asset records can help the City inspect and maintain infrastructure more consistently, while better visibility across pressure managed zones can support earlier detection of possible water losses or service risks.

Together, these improvements strengthen the City's ability to manage water infrastructure more consistently across communities.

# What made this possible

The success of the W&S dashboards was not only technical. It was supported by a stronger institutional environment within the City of Cape Town.

Key enablers included:

- **Centralised data strategy:** The City's data strategy provided a shared direction for data use, analytics and interoperability.
- **Internal technical capacity:** The City had internal teams able to understand, host, work with and sustain the relevant tools and operational data.
- **Municipal ownership:** CCT's Data Science and W&S teams were closely involved in shaping, testing, validating and driving the work.
- **Co-creation with users:** OCL and CCT teams worked together to understand the data structures, workflows, error conditions and operational realities.



## What made this possible

- **Existing systems and data foundations:** The tools worked with SAP, GIS, sensor and monitoring data already used by the City.
- **Cross-team collaboration:** The use cases created shared points of engagement between teams that manage different systems, datasets and infrastructure responsibilities.
- **Workflow alignment:** The dashboards responded to clear operational needs: reconciling asset data and monitoring pressure managed zones so that infrastructure can be better managed.
- **Agile development:** The process allowed users to test outputs, question anomalies and suggest changes as the tools evolved.

These conditions helped the tools move beyond technical outputs and become part of a broader shift towards more coordinated, data-informed infrastructure management.



# What still needs to happen



While both dashboards have shown early value, there is still work to do before they are fully embedded into standard operating processes.

Future priorities include:

- completing outstanding data reconciliation;
- rolling the tools out to additional users;
- providing further training and onboarding;
- clarifying responsibilities for resolving specific data issues;
- strengthening data quality across SAP, GIS and operational systems;
- validating automated outputs against existing manual processes;
- building user confidence in the dashboards;
- embedding the tools into routine W&S decision-making;
- ensuring the tools are used consistently for operational planning, maintenance and monitoring;
- exploring the Advanced Zone Management Analytics Dashboard's use in business continuity planning;
- positioning the Advanced Zone Management Analytics Dashboard as part of the W&S 24/7 control room environment.

## What still needs to happen

Broader rollout of the Asset Matching Dashboard is still dependent on outstanding data reconciliation. This reinforces an important lesson: interoperability work often surfaces deeper governance and data quality issues that need to be resolved before a tool can be fully operationalised.

Similarly, the Advanced Zone Management Analytics Dashboard has strong potential, but needs continued validation, trust-building, onboarding and workflow integration to move from ad hoc use to regular operational use.

A developed tool is not the same as an embedded tool. Long-term value depends on adoption, data readiness, user confidence and integration into daily workflows.





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