IMQS: SEWER INFRASTRUCTURE MODULE

Sewer Infrastructure Planning and Operations Management Tool

SEWER INFRASTRUCTURE MODULE

The IMQS Sewer Infrastructure Module is a web-based planning and operations management tool that enables better sewer infrastructure management.

The module integrates with specialist hydraulic software packages to offer a geographically linked, infrastructure-lifecycle focused representation of a municipality's sewer reticulation network. IMQS enables the consolidation of master planning results (hydraulic model analysis) in spatial (GIS), tabular and graphical formats. The centralised information, that links directly to a city's asset register, enables users to easily access and utilise important asset information such as performance, utilisation, criticality and replacement value, as well as important technical information such as pipe connectivity, length, material and diameter.

The IMQS Sewer Infrastructure Module curates information on a user-friendly web-interface that offers real geographic insight into a city's hydraulic system. In this way, municipalities are empowered to better plan, develop and manage their sewer systems and achieve greater levels of service to their clients.

TECHNOLOGY

IMQS is a web-based enterprise application software that enables effective infrastructure lifecycle asset management. The software consists of a collection of web-services and components that are supported by specialised tools and frameworks. The core platform provides an extensive set of generic functionalities, that together make the implementation of infrastructure projects possible. Due to its high level of configurability and ability to combine componentised sets of functionality, IMQS offers a highly flexible framework able to produce tailored-made solutions. Users primarily interact with the IMQS service through a browser-based front-end, which is additionally supported by tablet-based apps.

WHO WE ARE

IMQS builds specialised, GIS-centric software for the Infrastructure Asset Management market. This means that we are committed to conceptualising and constructing solutions for real-world problems that impact the lives of people, at all levels and from all communities, on a daily basis. It is our business to think of innovative ways to enhance the value of your organisation's physical assets, while you focus on the work that matters – delivering key services to your valued customers. IMQS's software is currently enabling effective decision-making, service delivery and customer satisfaction in over 100 government and private organisations in South Africa and internationally.

SEWER MODULE CLIENTS

- City of Tshwane
- City of Cape Town
- Johannesburg Water
- Amathole District Municipality

TECH BENEFITS

- Cloud-based
- Seamless deployment
- Fast and Secure
- Customizable
- User-friendly
- Mobile

IMQS IN NUMBERS

- **86 518 km** combined length of sewer pipes
- **3 892 086** lines of code used to program our software and counting

Interfaces for the enterprise software follow REST principles, both internally and externally. All constituent services have a published API as their primary interface. These interfaces are the foundation on which the browser-based front-end is built. Standard protocols, like HTTP with JSON payloads, however, make it effortless for third parties to consume them for integration purposes. Authentication and authorization services enable security on the interface level.

IMQS's web-based stack runs on enterprise operating systems, including Linux (with Docker containerisation) and Microsoft Windows Server. Database technologies include Microsoft SQL Server and PostgreSQL, which are both tried and tested in high-demand environments.

A dedicated DevOps team manages on-site deployments from a central point. IMQS DevOps makes use of in-house developed, fit-for-purpose tools to manage client-specific data and configuration. The IMQS operations team attends to monitoring server health and service performance by using state-of-the-art monitoring software. This enables fast detection and pro-active response to potential issues in the production environment.
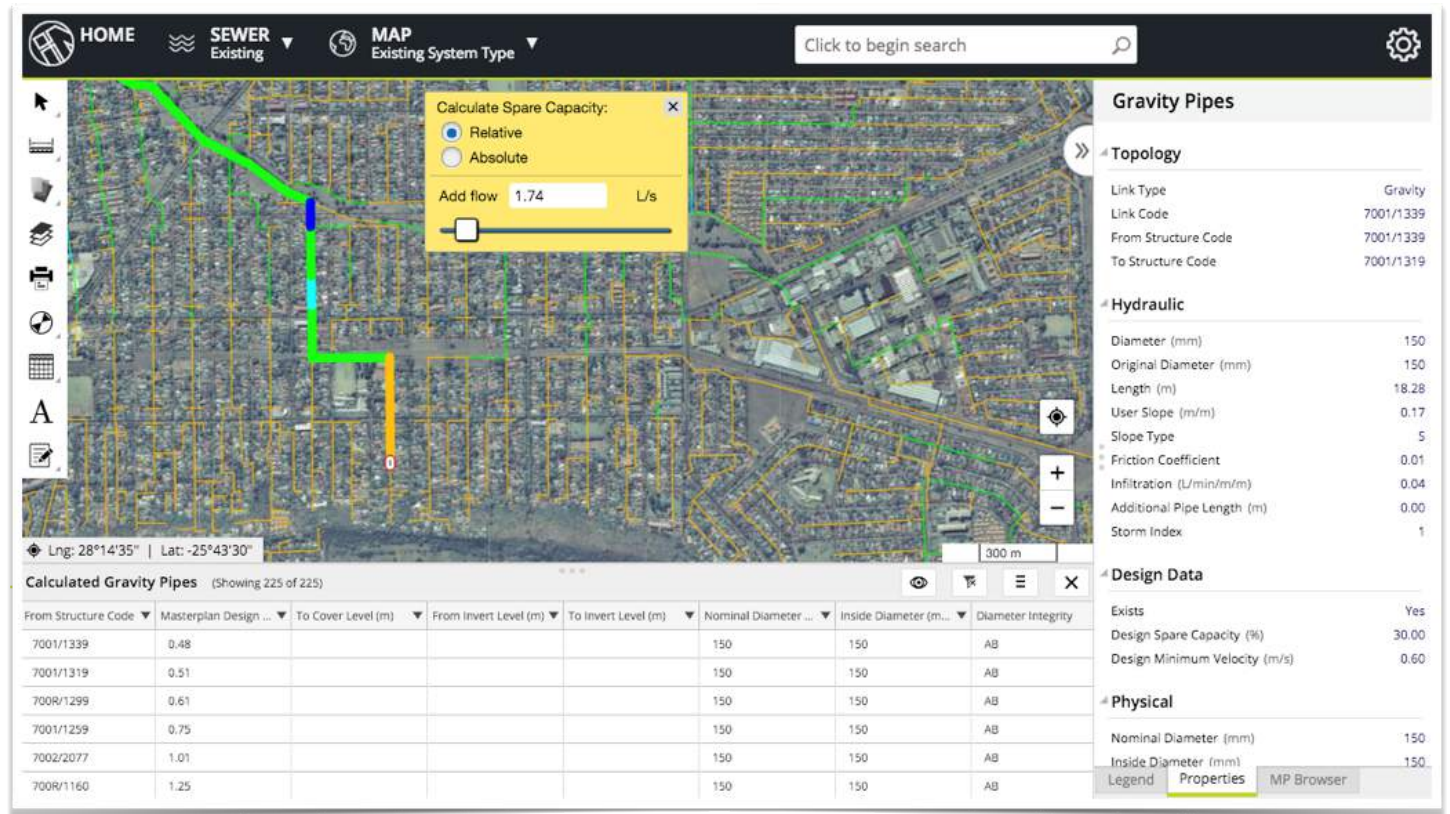

Image 1: Add Flow Tool in Action

KEY FEAUTRES

GEOGRAPHIC INFORMATION SYSTEMS

The GIS functionality implemented in the IMQS Sewer Infrastructure Module shows the sewer network infrastructure overlaid on a spatial map in order to visualize the complete sewer infrastructure of an area defined by municipal boundaries. The sewer infrastructure is made up of various layers, which includes pipes, sources, valves, etc. Each layer is broken down into more detail and categorized according to a legend. The pipe network could be categorized according to pipe diameter where each range of diameters is colour coded on the map to be easily identified.

THEMES

In IMQS, themes provide a user with the ability to easily interpret the data by spatially displaying map opbjects in the form of shapes, symbols and colours. A theme comprises multiple layers, where each layer contains data of the same type like sewer pipes, valves or water sources. Each layer in turn uses one field within the dataset. This means that values contained in the field are grouped into ranges and each range is then reflected as a specific colour on the GIS Map. The data is then displayed as a point, line or polygon on a map, where the colour and symbol is defined by the theme.

KEY FEATURES (continued)

BESPOKE REPORTING

The reporting system is based on standard engineering reports that can be viewed on the IMQS built-in reporting platform. The reporting platform includes standard reporting tools such as filtering on a report or global level, but also more advanced capabilities that produce more complex reports, which in include graphs.

COMPREHENSIVE DATA GRIDS

Comprehensive Data Grids display data on a GIS Map in a list format. Users are able to find a range of features, like sewer pipes, based on simple or more complex joint-filtering criteria. Other features such as sort, filter, export and conditional-statements selection are also included.

MASTERPLAN BROWSER

The Masterplan Browser offers a spatial representation of current and future sewer-network related projects. A user is able to link project boundaries on a GIS Map to sewer network feature that exist in the Future Sewer Network Model. This function provides an engineer with a powerful tool to spatially visualise projects and their effect on the Future Model.

UPSTREAM / DOWNSTREAM TOOL

The upstream tracing tool allows users to easily determine the source of sewerage flow. With downstream tracing as user can determine the most immediate pipe network that is supplied by a selected pipe segment. Importantly, this functionality allows one to determine the impact on the downstream network when the flow of sewerage to a selected pipe segment is blocked.

OPERATING SCENARIOS

In IMQS an operating scenario represents a specific spatial view of data. Therefore, a sewer-network model offers a spatial representation of current and future (planned) sewer-network infrastructure. With IMQS an engineer is, therefore, able to easily model the effects of changes to a sewer network over time in the form of a Future Sewer Model. This offers real insight to future project planning.

CONNECTED STANDS / SMS NOTIFICATION

Connected Stands is a functionality that helps a user to identify all stands that are connected to a pipe segment. This tool can be used in conjunction with the Upstream/Downstream Trace Tool to quickly identify all stands that will be affected when a pipe is isolated or when the downstream flow is cut off. In the case of emergency repairs or planned maintenance, an sms can be sent to all owners or consumers linked to a selected stand on a GIS map to inform them of service interruptions.

MEMO TOOL

The Memo Tool enables its user to report data discrepancies on the model via the IMQS web browser, when incorrect data, reflected in the model, is compared to actual inspections. The user can identify the model feature, like a pipe or valve, on the GIS Map and report the discrepancy to the engineering firm responsible for the maintenance of the model via an automated emailing system.

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ADD FLOW TOOL

The Add Flow Tool enables technical users to see if sewer networks have the capacity to support future developments. This functionality makes use of the flow rate of sewer pipes to determine if there is enough capacity for development.
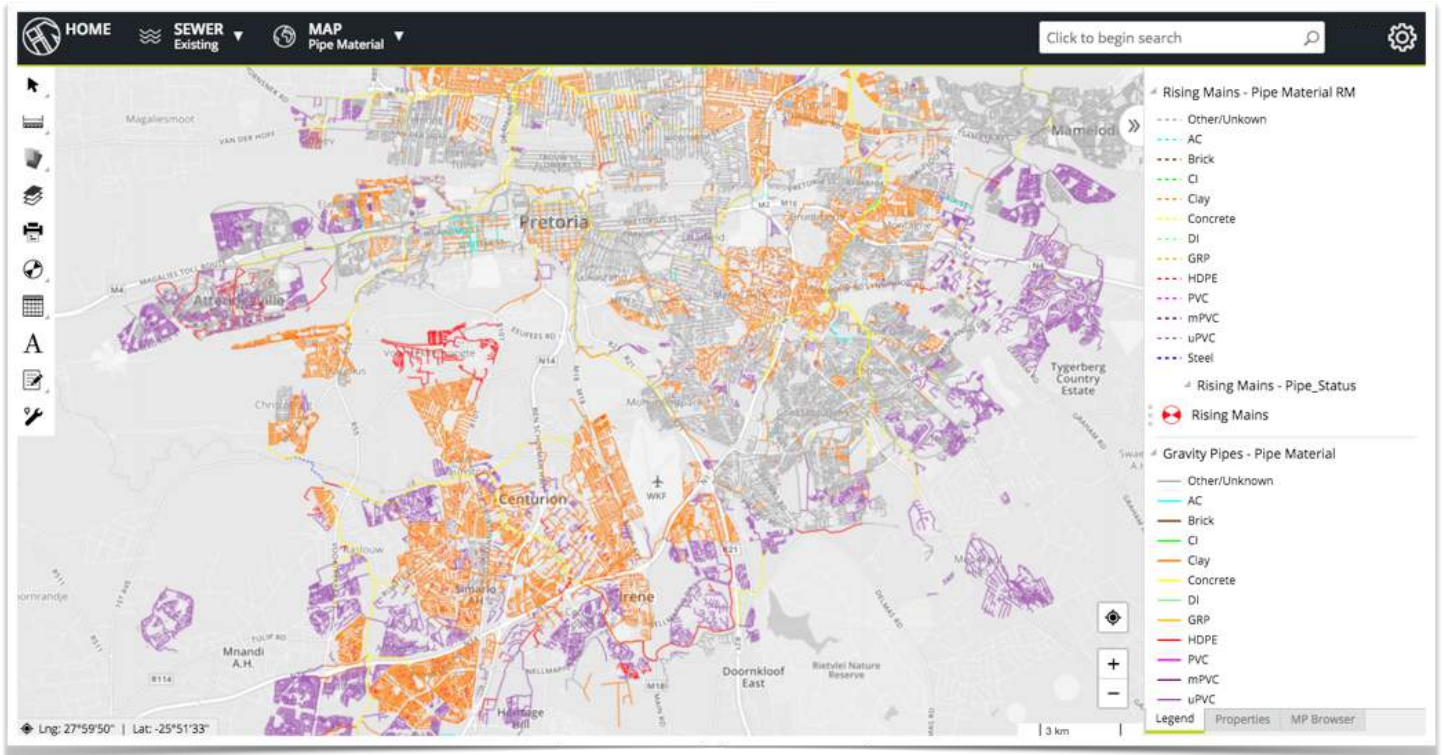

Image 2: Sewer Map Themed by Sewer Pipe Material

CONCLUSION

The IMQS Sewer Infrastructure Module empowers municipal agents to better manage their sewer infrastructure network. In so doing, this software package helps municipalities achieve greater customer satisfaction and concise communication. Our centralised spatially enabled information management system facilitates current and future planning, streamlines proactive and reactive maintenance and promotes informed decision-making. The visualisation of information, as well as innovative reporting functionalities, makes IMQS a key node in the communication between municipal stakeholders, departments and public. While IMQS maintains its own powerful GIS system, the module integrates with other GIS ERP systems, such as ESRI. This offers users the freedom to work on their preferred GIS platform without having to waste time by switching between systems.

CONTACT.

Erick Underhill
HEAD OF MARKETING
E: erick.underhill@imqs.co.za

Masheke Mukwamataba
CHIEF INNOVATION OFFICER
E: masheke@imqs.co.za

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WWW.**IMQS**.CO.ZA