

Road Map To A Next Generation Water Utility Network

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Magalies Water Board



THE SOUTHERN AFRICA ESRI USER CONFERENCE 2023

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- The previous UC dealt with “the where”

.....now

- User requirements as result of consultative engagement, moving away from static “pdf” maps
- Interactive (intelligent) maps requested by end-user
- Solution based on logical arrangements and operation of the system
- Near real-life simulation of the distribution system
- *Collaboration between ESRI-SA & Magalies Water on a Proof Concept*

- With more than 500km of pipeline, a robust and reliable system was sourced.
- Render quick accurate information without reference to the “as-built drawings”
- Using available internal resources

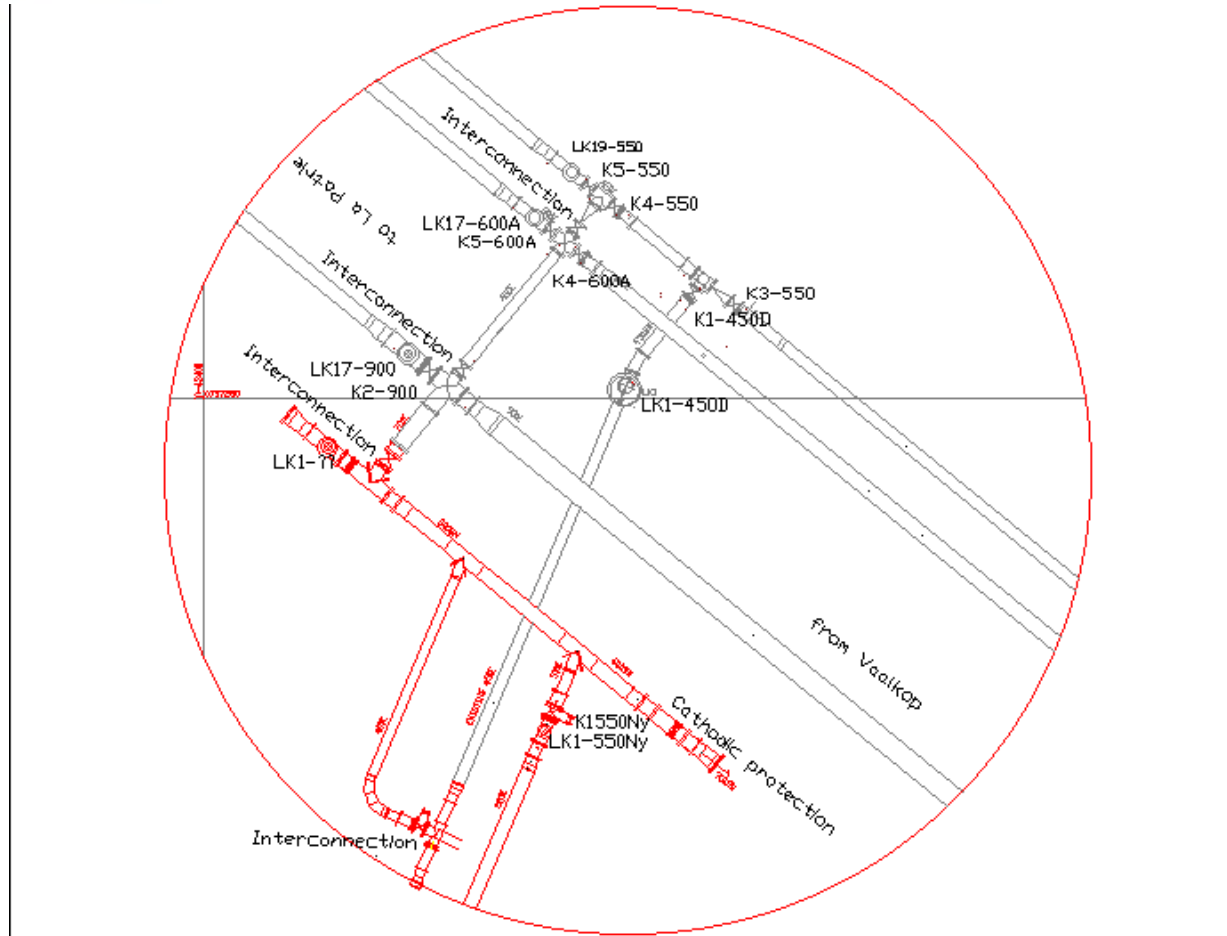
- Phase 1 – data collection and information
 - As built drawings
 - Shapes files
 - Schematic drawings
- Phase 2 – data corroboration
 - Spatial Database creation
- Phase 3
 - Enterprises GIS – Portal
- Phase 4
 - Utilities Network (2023)
- Phase 4 (a)
 - Field data capture – Survey 123 (2023)







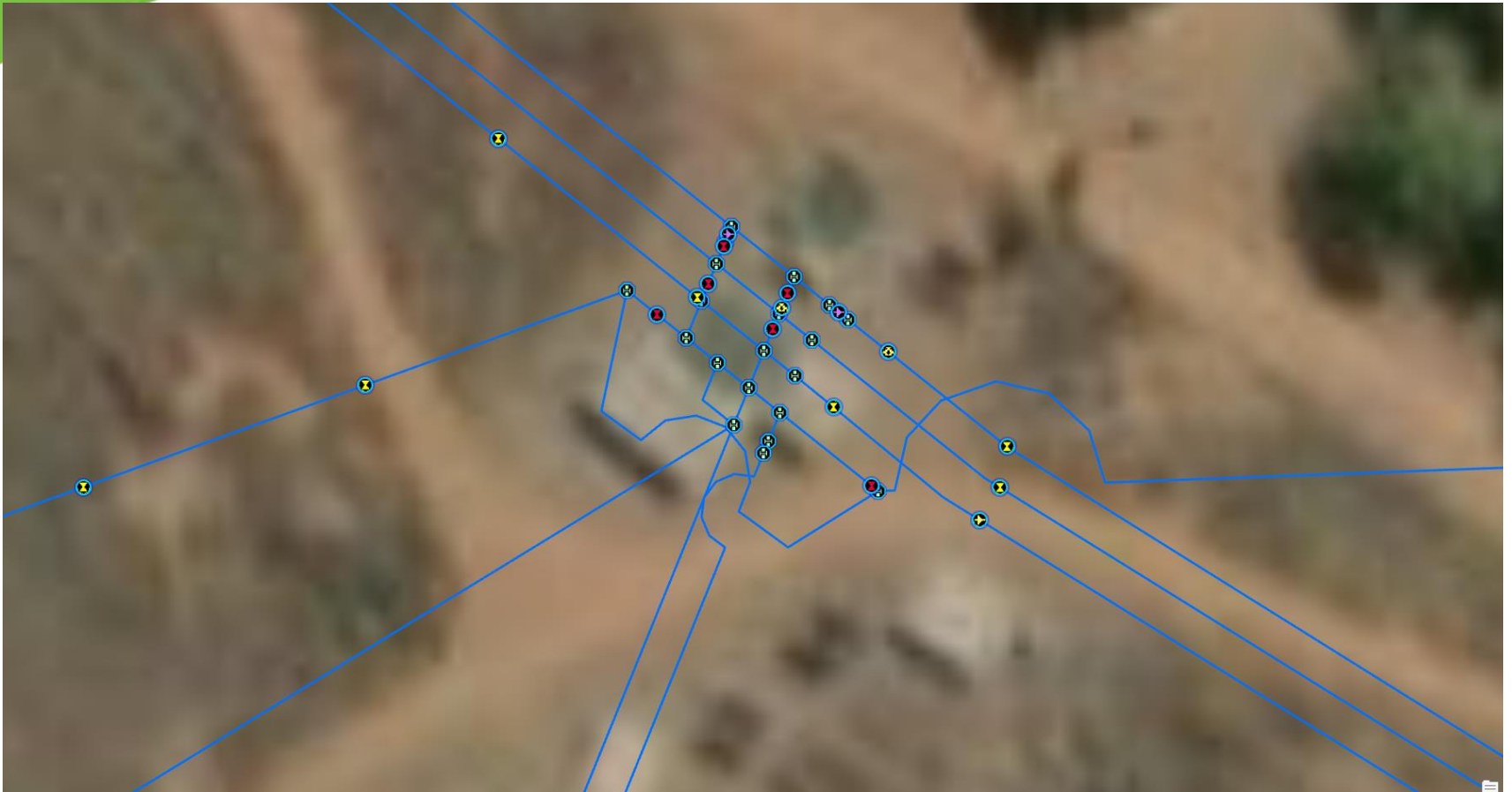
Typical complex junction #Tracing





Mag...





- Sketching – effortlessly making changes directly to the DB e.g. new connections
- Tracing (Simulations) by system users
- Limiting the number of feature classes and
- Reducing slow relationship queries

Magalies Water Evaluation - UN 2023 - Water Distribution Editor - ArcGIS Pro

Feature Layer | Linear Referencing | Utility Network

Project | Map | Insert | Analysis | View | Edit | Imagery | Share | Arc Hydro | Utility Network Add-In | PerfTools | Appearance | Labeling | Data | Data | Data

Clipboard | Manage Edits | Snapping | Features | Selection | Tools | Elevation | Corrections | Data Reviewer

Command Search (Alt+Q) | Not signed in

Water Distribution Editor | Diagram

Contents

Search

Drawing Order

- Water Device
- Water Assembly
- Water Junction
- Structure Junction
- Water Network
 - Water Cathodic Protection
 - Water System
 - Water Pressure
 - Subnetwork name
 - Bospoort-Biotekong
 - Elandsfontein Reservoir
 - Phatsima Booster PS to Reservoir
 - SubNW_Brulpadda_C13_North
 - SubNW_Brulpadda_E2_Goewermentsplaas
 - SubNW_Elandsfontein_F1_ThabazimbiTank
 - SubNW_Goewermentsplaas_E1_North
 - SubNW_LaPatrie_C3N
 - SubNW_LaPatrie_C7_Padda
 - SubNW_LaPatrie_C8_Padda
 - SubNW_LaPatrie_Mogwase
 - SubNW_LaPatrie_Planesberg
 - SubNW_LaPatrie_ReservoirSite
 - SubNW_Padda_C10_Brulpadda
 - SubNW_Padda_C7_Spitskop
 - SubNW_Padda_C8_Spitskop
 - SubNW_Spitskop_D1
 - SubNW_Spitskop_D3
 - SubNW_Vaalkop_Bospoort
 - SubNW_Vaalkop_Evergreen
 - SubNW_Vaalkop_Evergreen-B2
 - SubNW_Vaalkop_Kortbegrip
 - SubNW_Vaalkop_LaPatrie
 - SubNW_Vaalkop_WTP
 - Other
- Water Isolation

1:2,128 | 27.48624025°E 25.32067223°S | Selected Features: 0


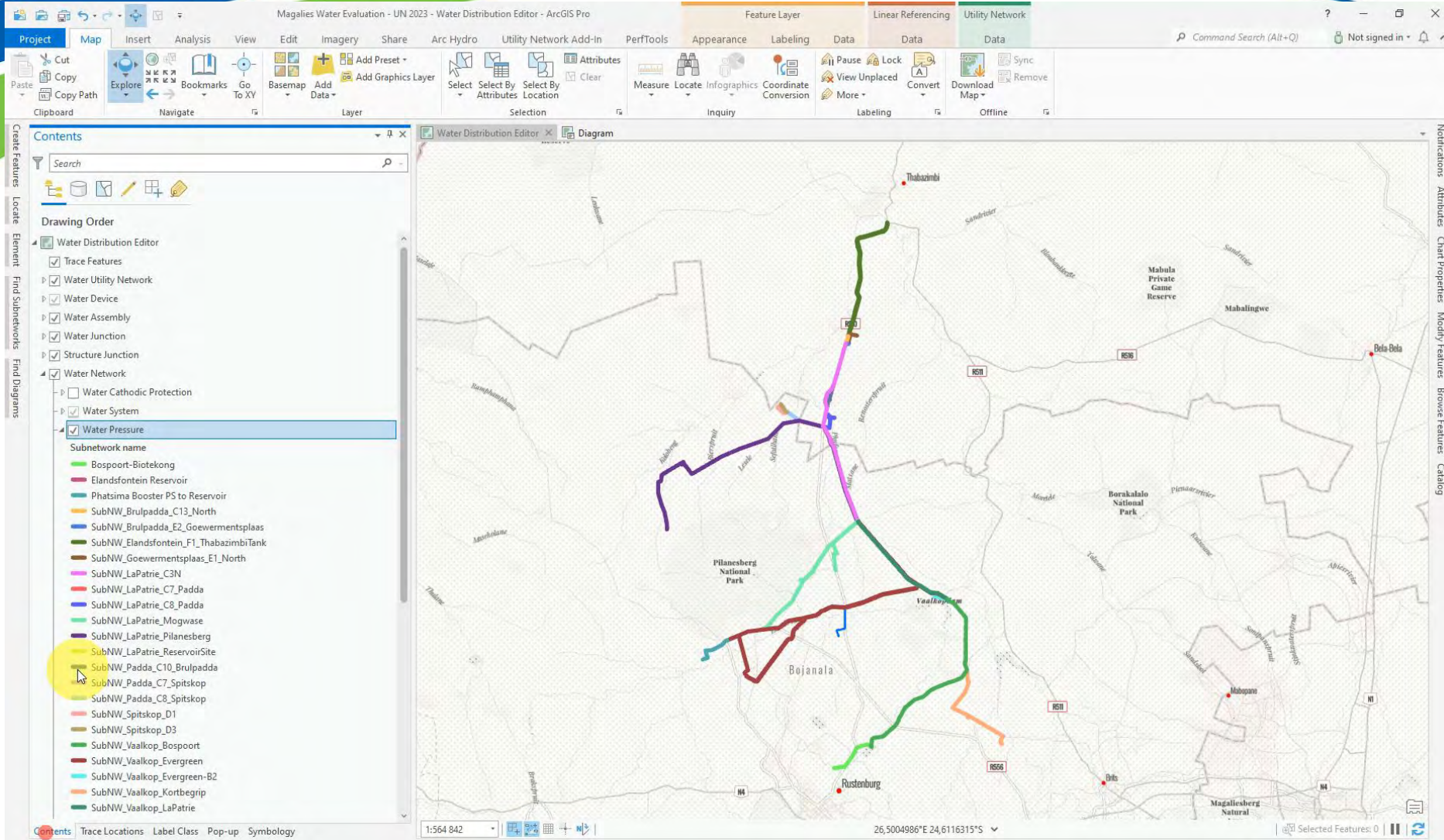


Chart Properties | Modify Features | Browse Features | Catalog | Find Subnetworks | Pop-up

Selecting pumps and running a trace

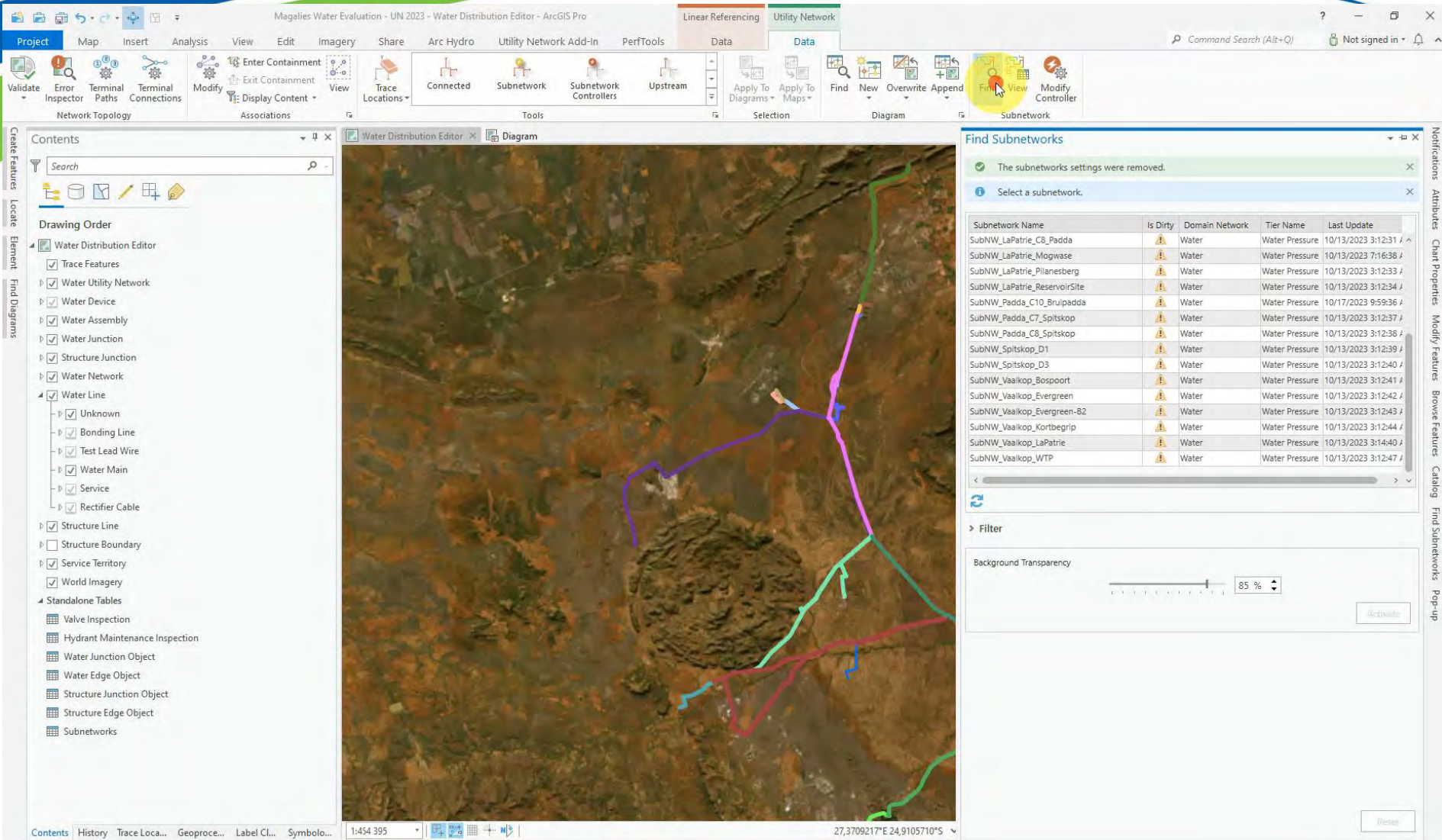


The screenshot shows the ArcGIS Pro interface for the 'Magabies Water Evaluation - UN 2023 - Water Distribution Editor'. The main map displays a water network with various subnetworks color-coded according to the legend. The legend on the left lists the following subnetworks:

- Bospoort-Biotekong
- Elandsfontein Reservoir
- Phatsima Booster PS to Reservoir
- SubNW_Brulpadda_C13_North
- SubNW_Brulpadda_E2_Goewermsplaas
- SubNW_Elandsfontein_F1_ThabazimbiTank
- SubNW_Goewermsplaas_E1_North
- SubNW_LaPatrie_C3N
- SubNW_LaPatrie_C7_Padda
- SubNW_LaPatrie_C8_Padda
- SubNW_LaPatrie_Mogwase
- SubNW_LaPatrie_Pilanesberg
- SubNW_LaPatrie_ReservoirSite
- SubNW_Padda_C10_Brulpadda
- SubNW_Padda_C7_Spitskop
- SubNW_Padda_C8_Spitskop
- SubNW_Spitskop_D1
- SubNW_Spitskop_D3
- SubNW_Vaalkop_Bospoort
- SubNW_Vaalkop_Evergreen
- SubNW_Vaalkop_Evergreen-B2
- SubNW_Vaalkop_Kortbegrip
- SubNW_Vaalkop_LaPatrie

The map shows a network of pipes and structures, with a specific trace highlighted in green and orange. The interface includes a ribbon with various toolbars (Project, Map, Insert, Analysis, View, Edit, Imagery, Share, Arc Hydro, Utility Network Add-In, PerfTools, Appearance, Labeling, Data, Linear Referencing, Utility Network) and a Contents pane on the left. The status bar at the bottom indicates a scale of 1:564 842 and coordinates of 26,5004986°E 24,6116315°S.

Subnetwork simulation



The screenshot displays the ArcGIS Pro interface for the 'Magalies Water Evaluation - UN 2023 - Water Distribution Editor'. The main map shows a network of water lines overlaid on a satellite image, with various lines colored in purple, pink, green, and blue. The 'Contents' pane on the left shows the 'Drawing Order' for the 'Water Distribution Editor', including 'Water Line' (with sub-items like Unknown, Bonding Line, Test Lead Wire, Water Main, Service, Rectifier Cable), 'Structure Line', 'Structure Boundary', 'Service Territory', 'World Imagery', and 'Standalone Tables' (including Valve Inspection, Hydrant Maintenance Inspection, Water Junction Object, Water Edge Object, Structure Junction Object, Structure Edge Object, and Subnetworks).

The 'Find Subnetworks' pane on the right displays a table of subnetworks with the following data:

Subnetwork Name	Is Dirty	Domain Network	Tier Name	Last Update
SubNW_LaPatrie_C8_Padda	⚠	Water	Water Pressure	10/13/2023 3:12:31
SubNW_LaPatrie_Mogwase	⚠	Water	Water Pressure	10/13/2023 7:16:38
SubNW_LaPatrie_Piianesberg	⚠	Water	Water Pressure	10/13/2023 3:12:33
SubNW_LaPatrie_ReservoirSite	⚠	Water	Water Pressure	10/13/2023 3:12:34
SubNW_Padda_C10_Bruipadda	⚠	Water	Water Pressure	10/17/2023 9:59:36
SubNW_Padda_C7_Spitskop	⚠	Water	Water Pressure	10/13/2023 3:12:37
SubNW_Padda_C8_Spitskop	⚠	Water	Water Pressure	10/13/2023 3:12:38
SubNW_Spitskop_D1	⚠	Water	Water Pressure	10/13/2023 3:12:39
SubNW_Spitskop_D3	⚠	Water	Water Pressure	10/13/2023 3:12:40
SubNW_Vaalkop_Bospoort	⚠	Water	Water Pressure	10/13/2023 3:12:41
SubNW_Vaalkop_Evergreen	⚠	Water	Water Pressure	10/13/2023 3:12:42
SubNW_Vaalkop_Evergreen-B2	⚠	Water	Water Pressure	10/13/2023 3:12:43
SubNW_Vaalkop_Kortbegrip	⚠	Water	Water Pressure	10/13/2023 3:12:44
SubNW_Vaalkop_LaPatrie	⚠	Water	Water Pressure	10/13/2023 3:14:40
SubNW_Vaalkop_WTP	⚠	Water	Water Pressure	10/13/2023 3:12:47

The 'Find Subnetworks' pane also includes a 'Filter' section with a 'Background Transparency' slider set to 85% and an 'Activate' button. A status bar at the bottom shows coordinates: 27,3709217°E 24,9105710°S.

- No expenditure on system integration
- Internal resources used
- RIO as a measure on the investment incurred ([field licenses](#))
- Helpdesk developed (with ICT dept) as a measure, on the number of service calls received (Open, closed and pending call)

- Infrastructure – server reliance and remote cites with limited connectivity
- Bandwidth – thin-lines with heavy traffic – shared with other users
- Change management (Top-down or Bottom-Up approach)
- Project Funding

