Operational Uses Of Hydraulic Modelling at Affinity Water

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Affinity Water

Agenda

- Affinity Water overview
- Network model coverage
- Model Validation
- Operational hydraulic modelling support examples
  - No water
  - Inadequate pressure
  - Outages
  - Future developments
  - Water Quality
  - …
- Hydraulic model maintenance
- Case study

Affinity Water

AFFINITY WATER

- 3.5 million customers
- **900 ML / Day**

Supply Area: Bedfordshire, Berkshire, Buckinghamshire Essex, Hertfordshire, Surrey, the London Boroughs of Harrow and Hillingdon and parts of the London Boroughs of Barnet, Brent, Ealing and Enfield. We also supply to the Tendring peninsula in Essex, Folkestone and the Dover areas of Kent.

Affinity Water

Our history

- **We have been supplying water to the local community for more than 130 years.**
- The Colne Valley, Rickmansworth and Lee Valley Water companies combined forces in 1994 to form Three Valleys Water plc. The company grew again following a merger in October 2000 with sister company North Surrey Water, which was formed in 1973 from four founder companies.
- Veolia Water UK owned Three Valleys Water and its predecessors from 1987 and in July 2009 we changed our name to Veolia Water Central Limited.
- On 28 June 2012, Veolia Water Central was purchased by a consortium led by Infracapital Partners and Morgan Stanley Infrastructure Partners. Infracapital is the infrastructure investment fund managed by M&G (Prudential).
- On 1st October, we changed our name to Affinity Water.

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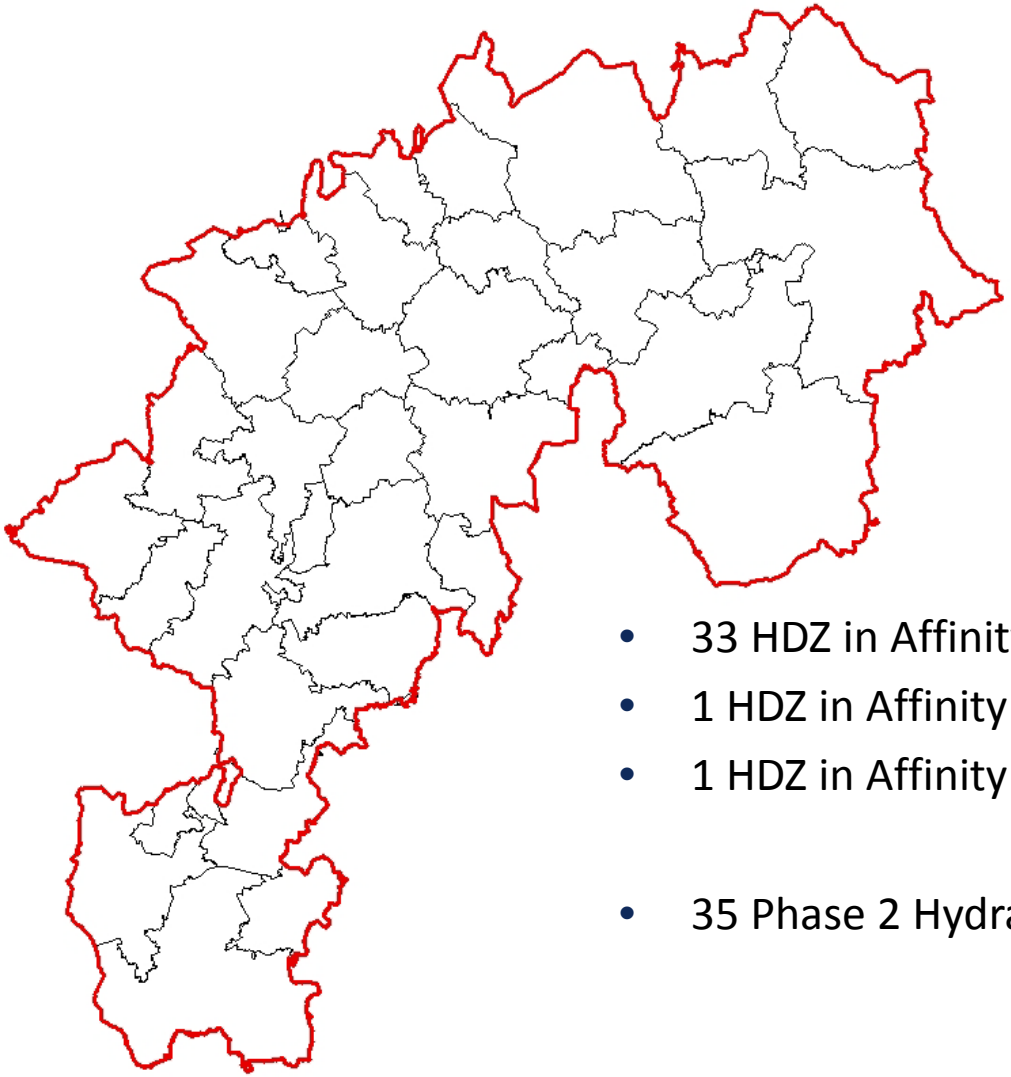
Network Structure & Model Coverage



- 33 HDZ in Affinity Water Central
- 1 HDZ in Affinity Water East
- 1 HDZ in Affinity Water South East

- 35 Phase 2 Hydraulic Models

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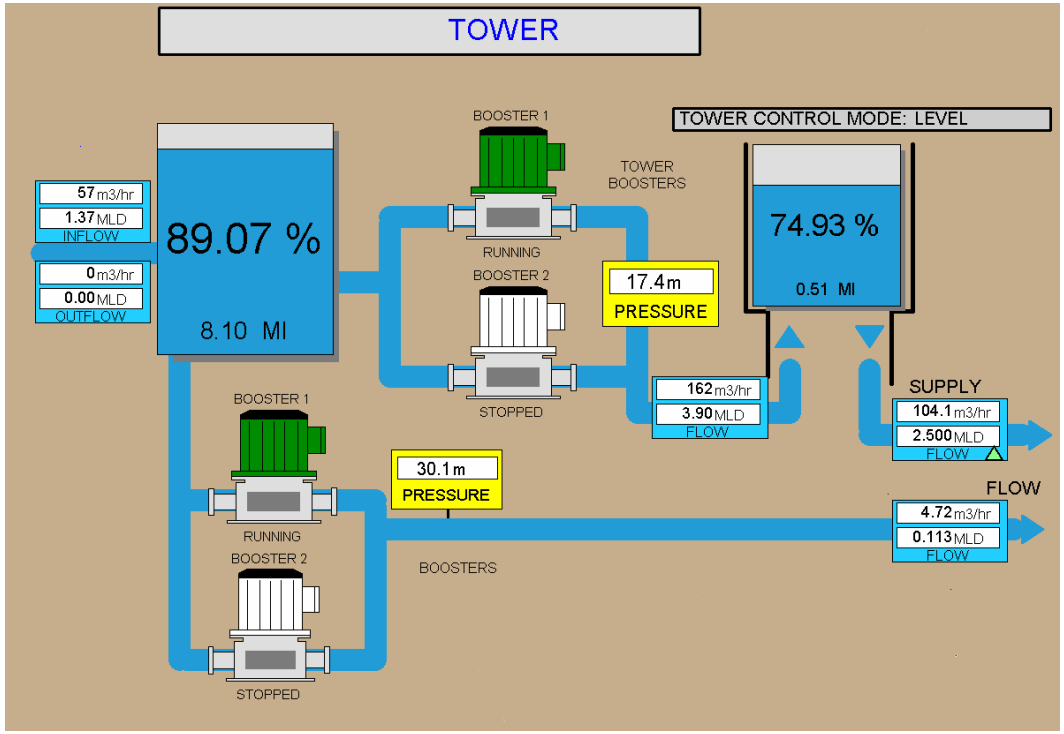
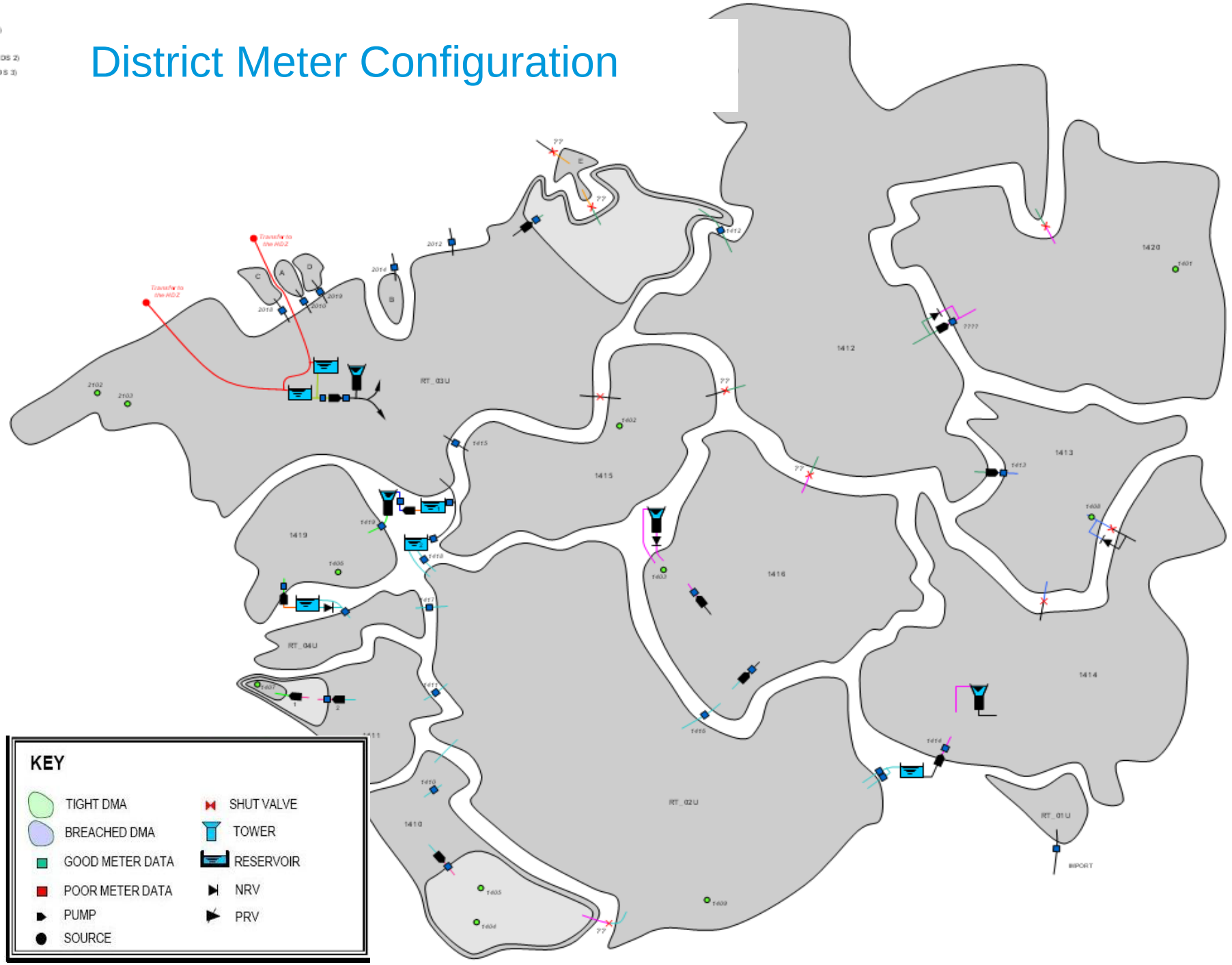
Model Validation

Loggers

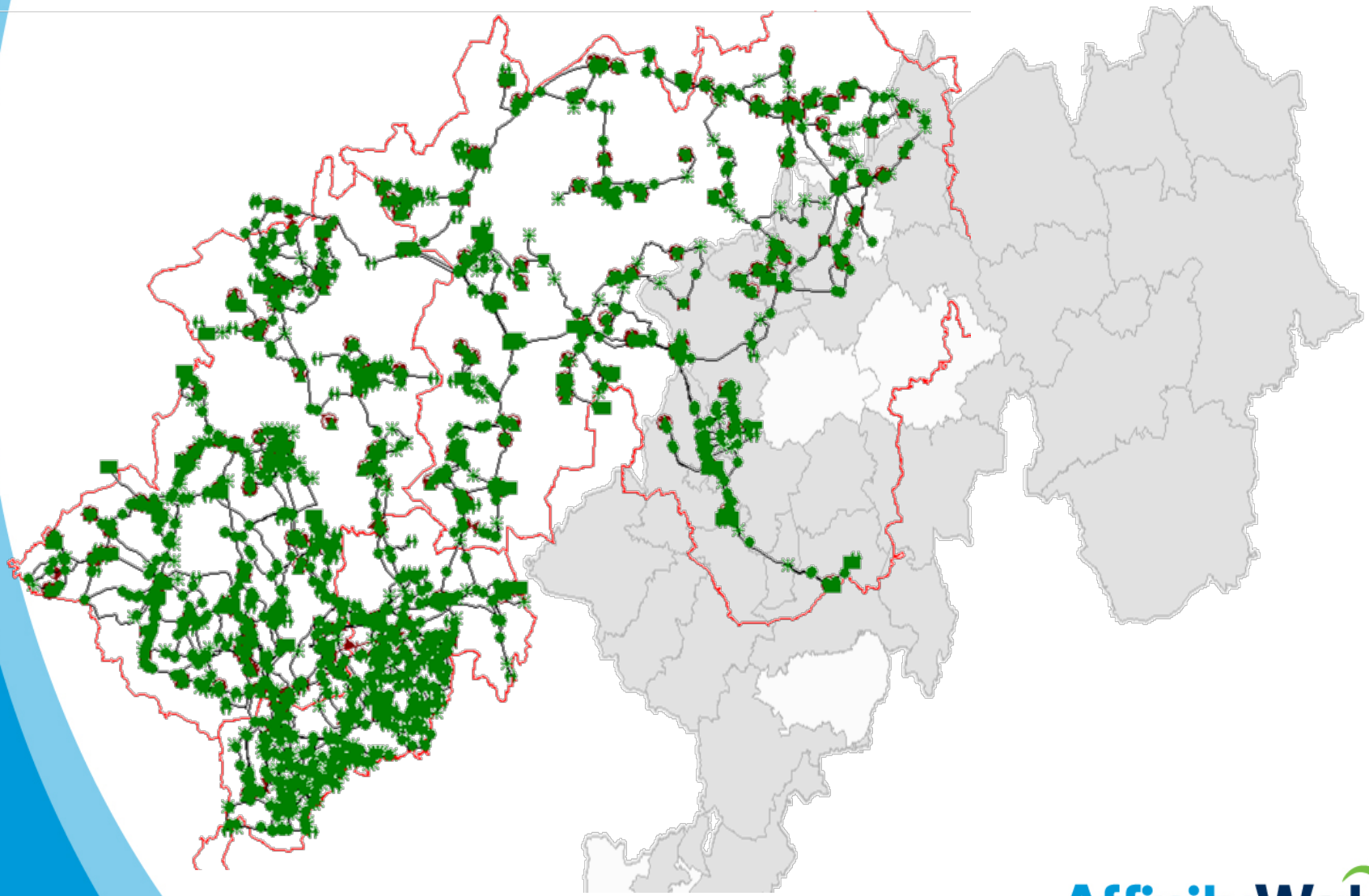
SCADA (Serc + Radcom)



District Meter Configuration



Strategic model



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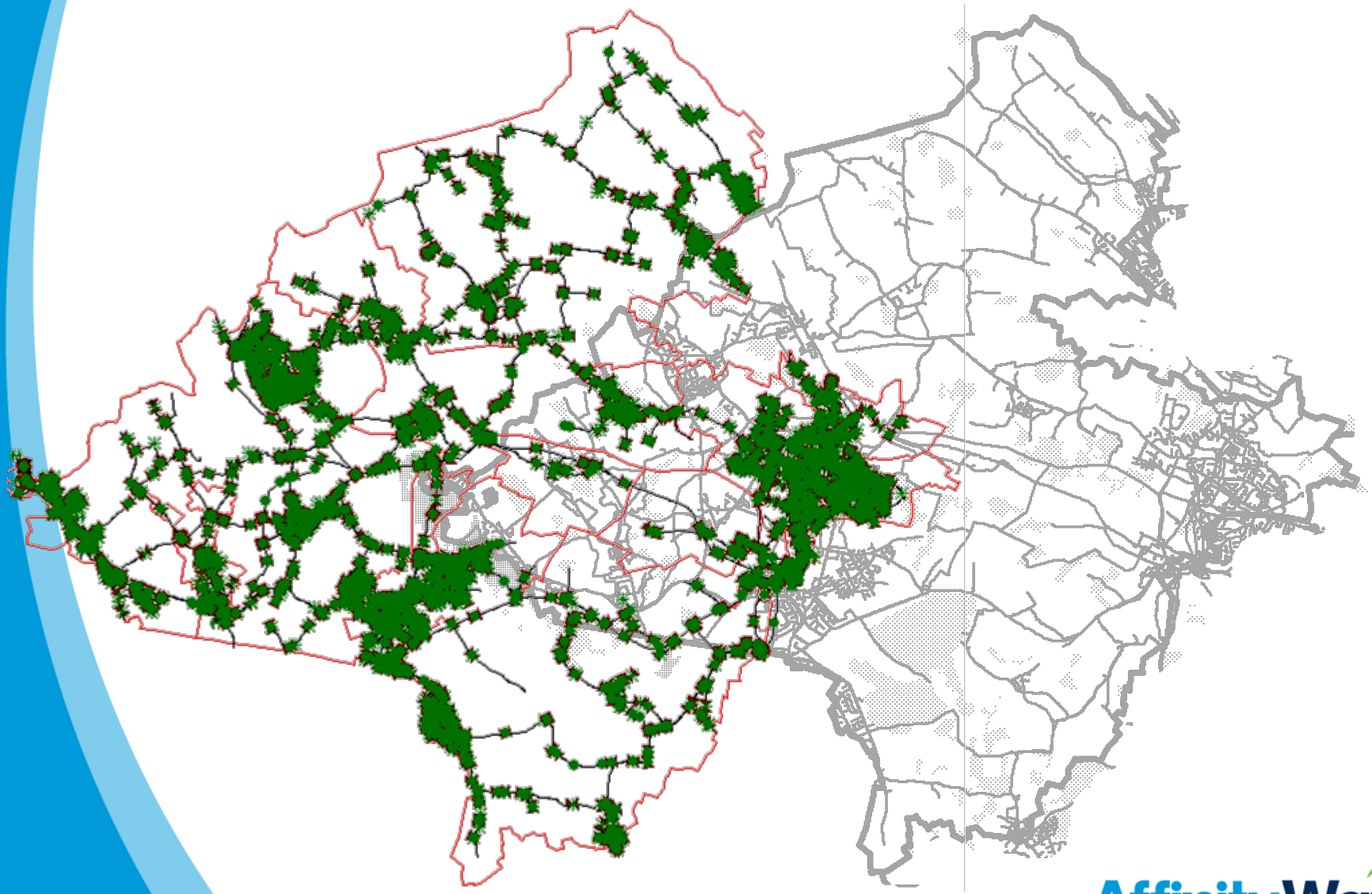
All main model



Standby support

Team of 10 Asset Performance Engineers providing 24/7 hydraulic modelling support in case of emergencies.

- Rezoning
- Burst location
- Tower/res outage
- Booster failure
- PRV failure

TO THE RESCUE

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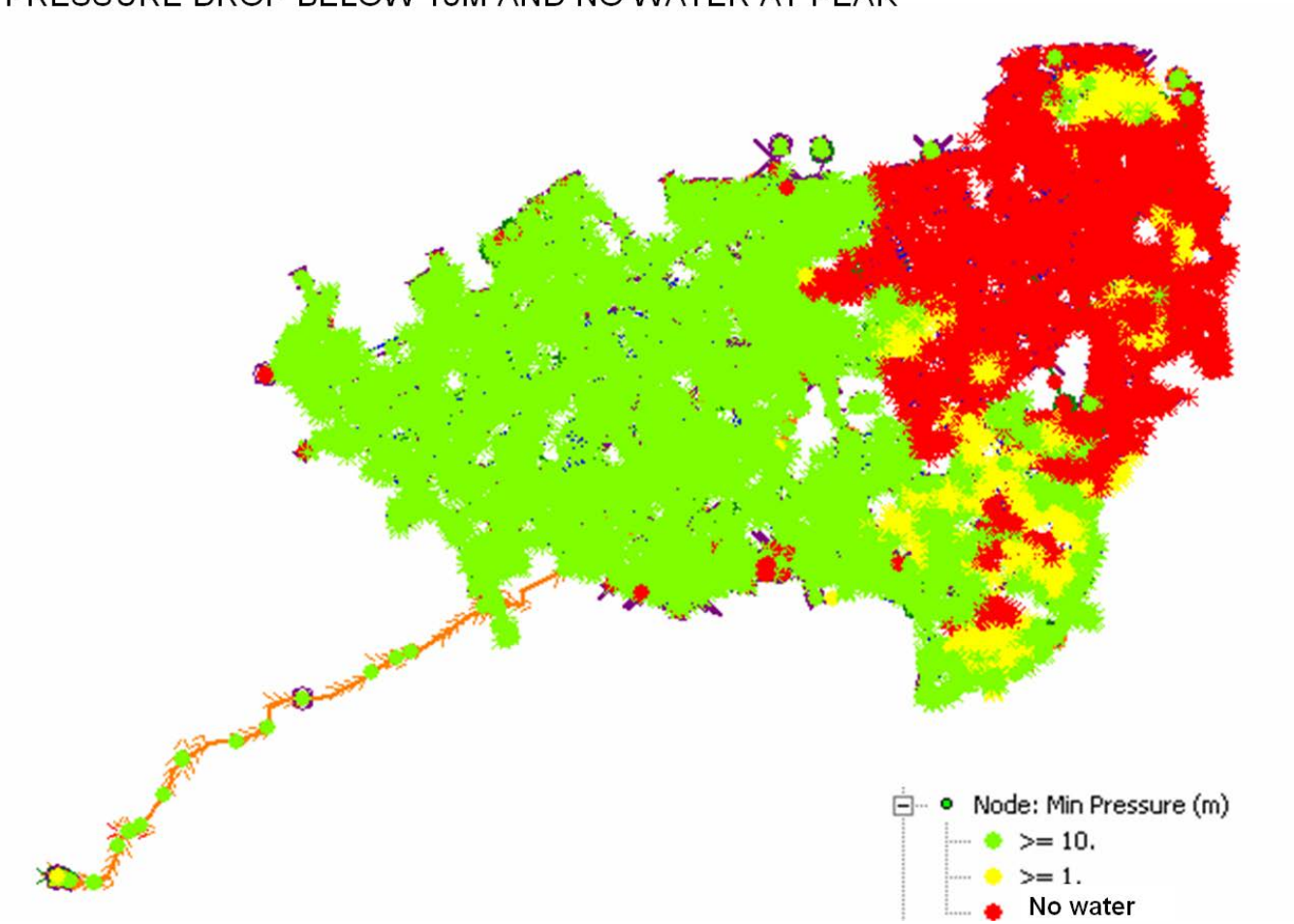
DG3 – modelling no water

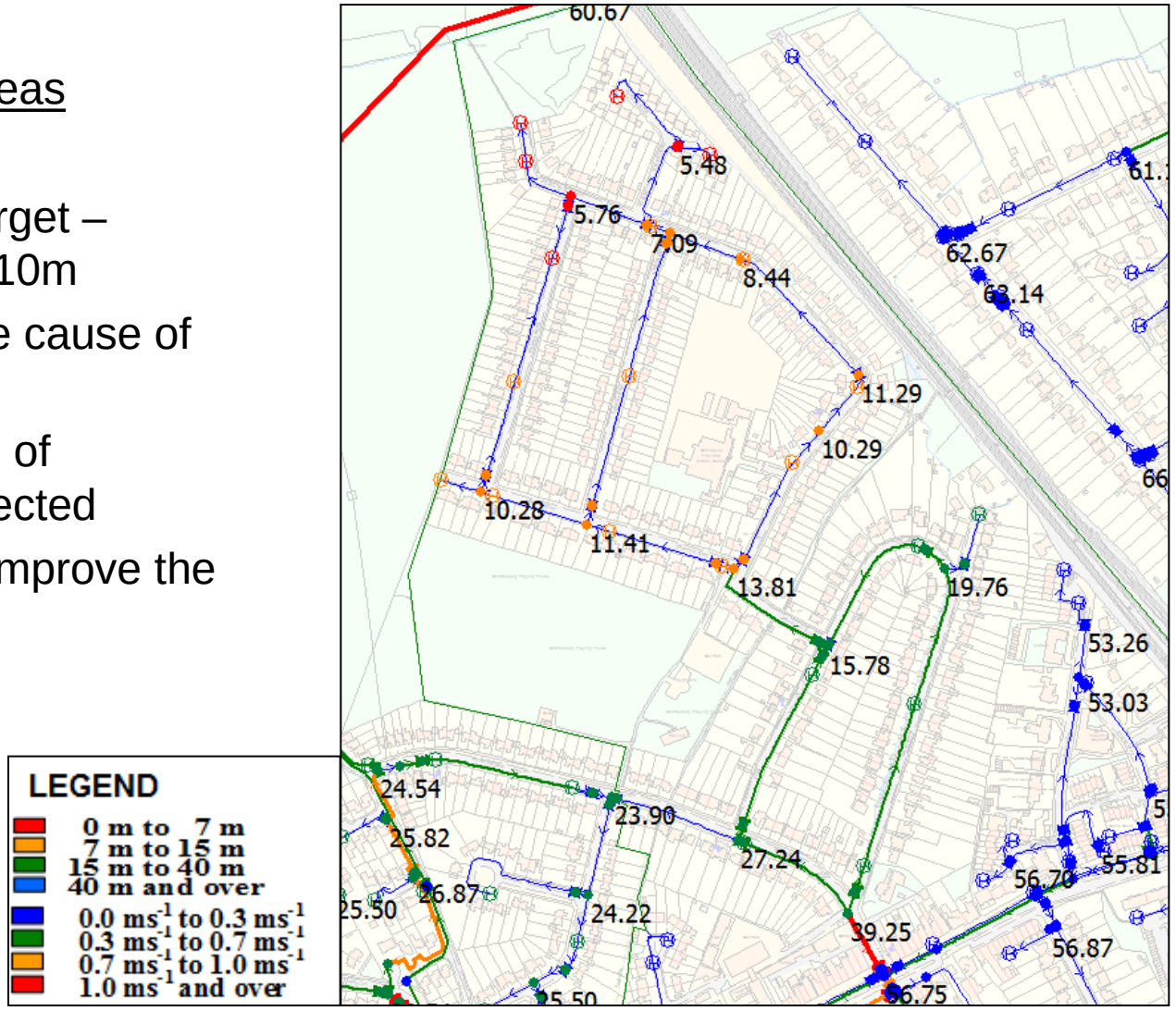
PRESSURE DROP BELOW 10M AND NO WATER AT PEAK



DG2 – modelling poor pressure

Poor Pressure Areas

- Company's target – pressure min 10m
- Investigate the cause of poor pressure
- Determine no. of customers affected
- Find ways to improve the network



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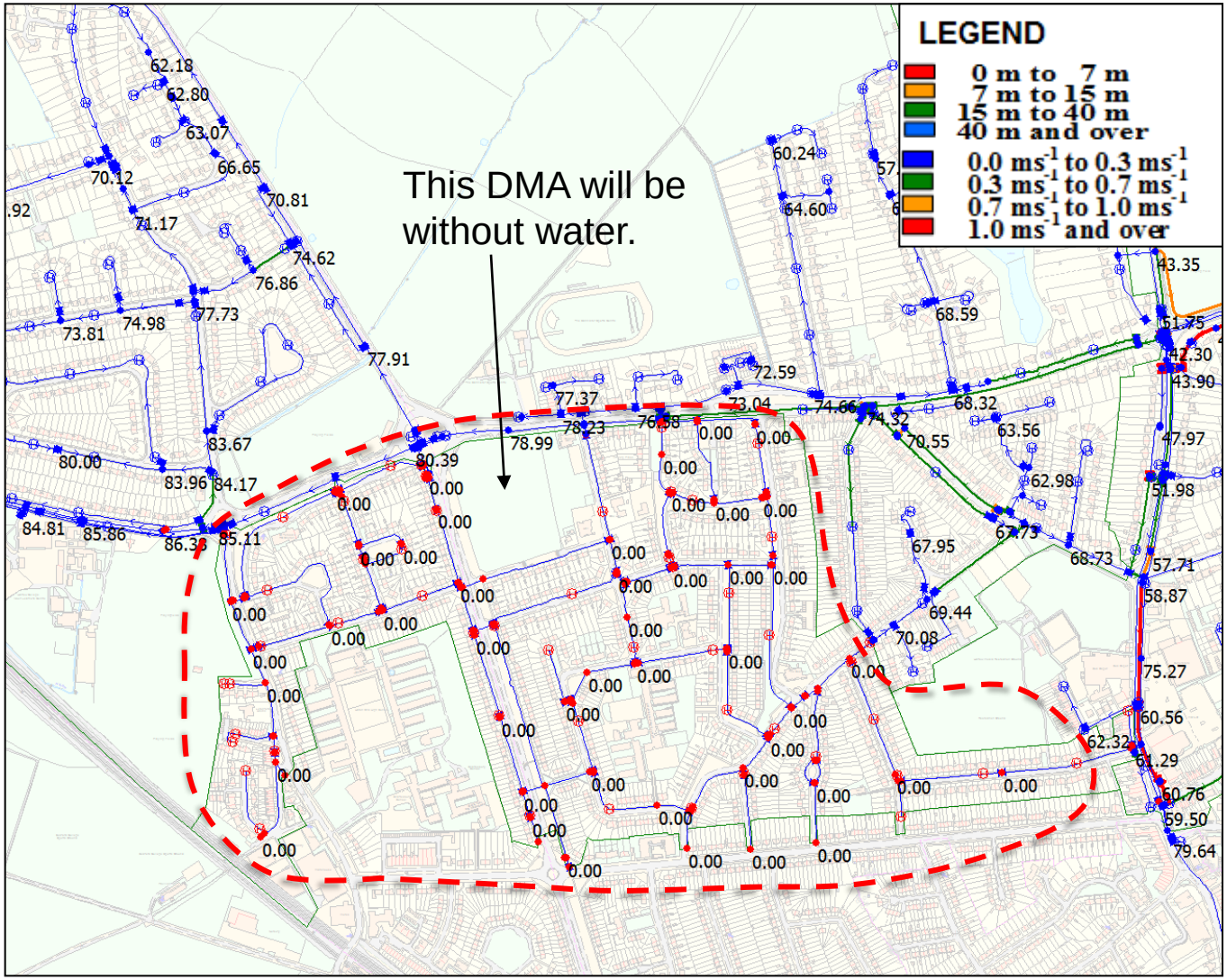
Network outage consequences



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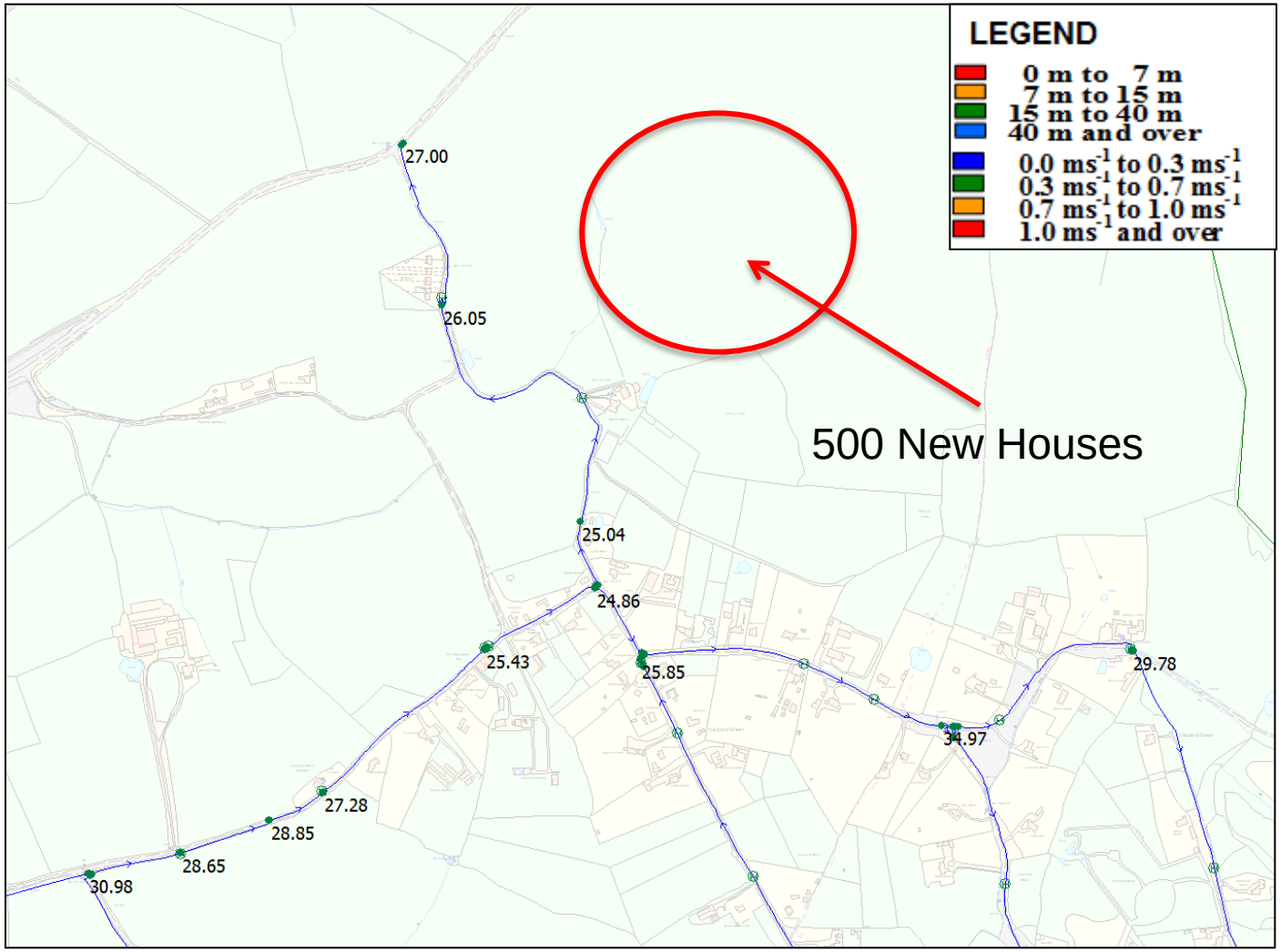
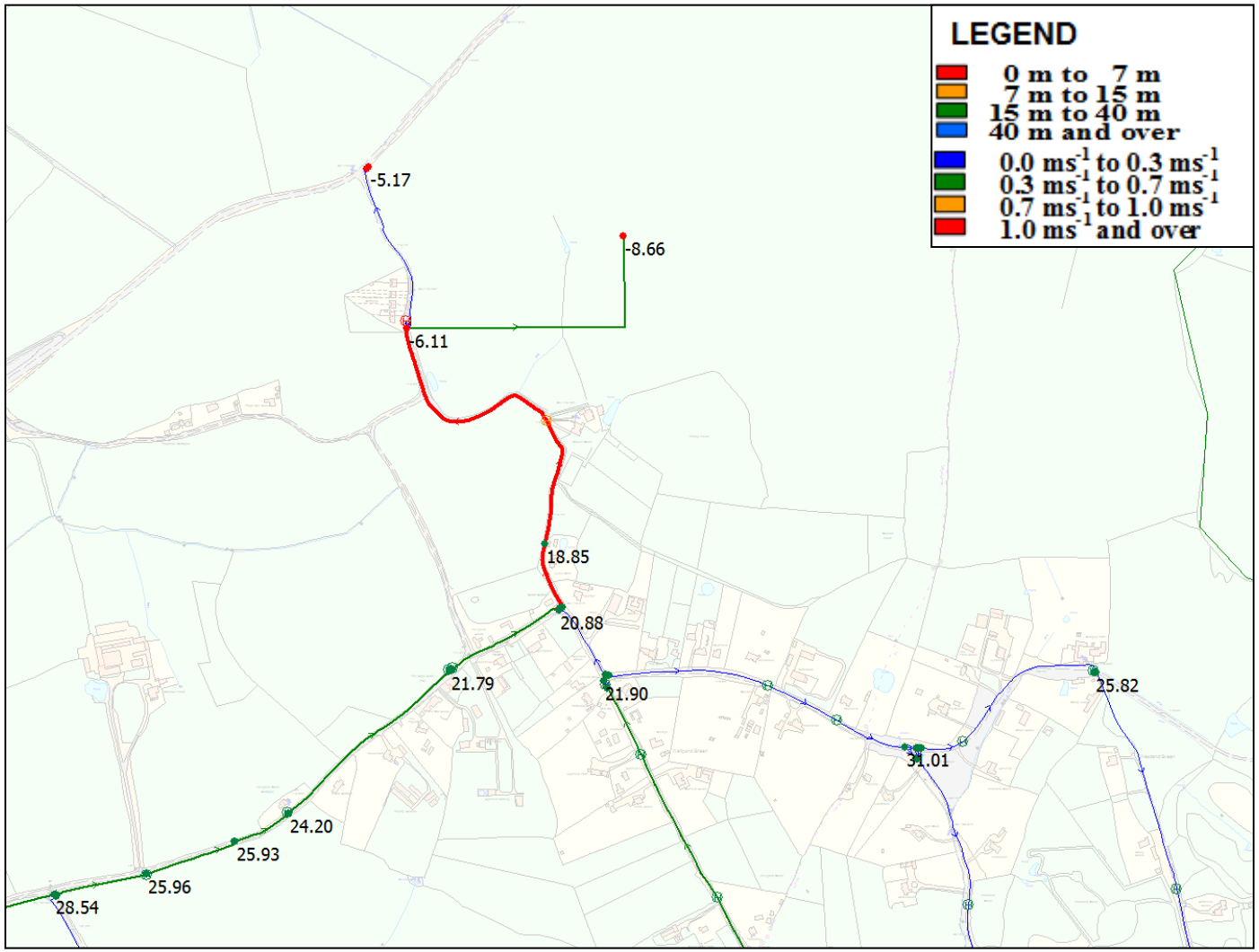
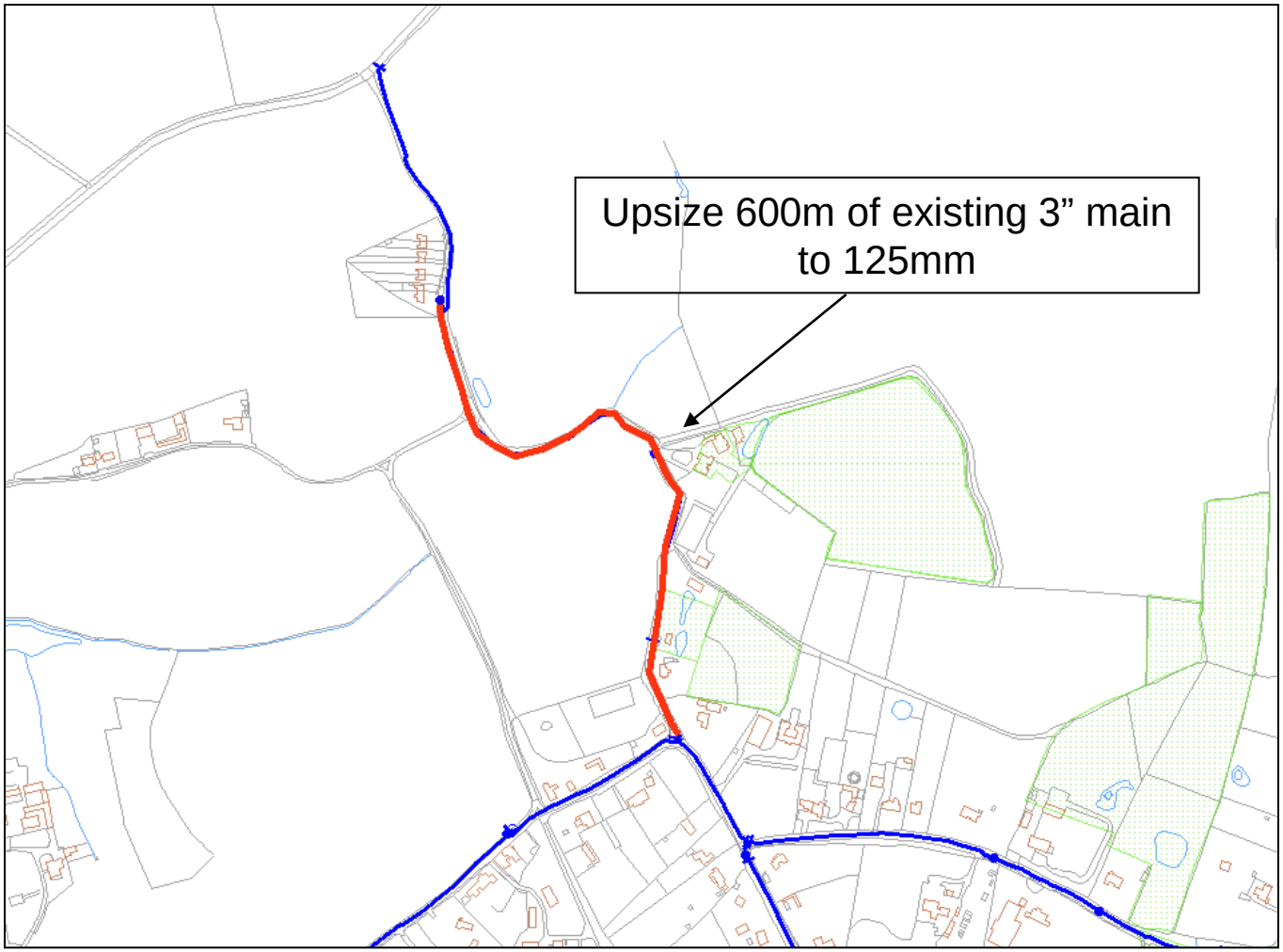
New Development - Proposal



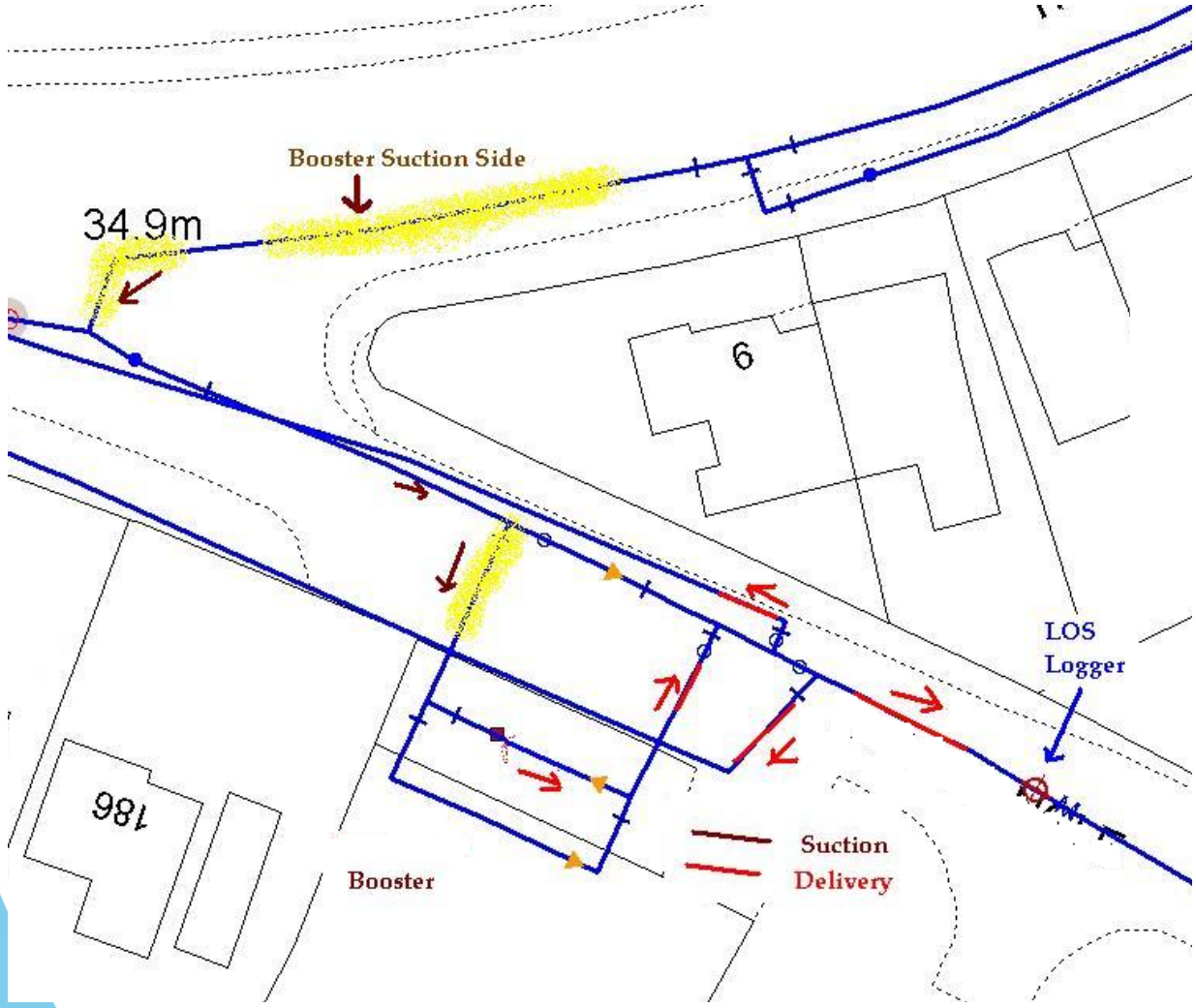
New Development - Impact

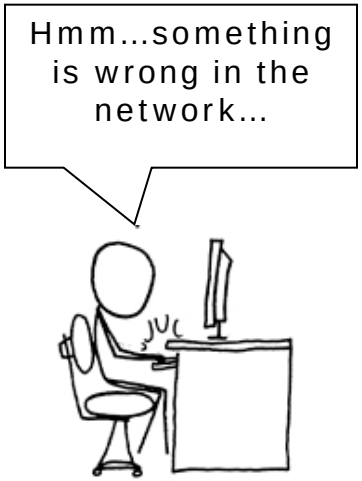


New Development - Reinforcements



Anomaly detection





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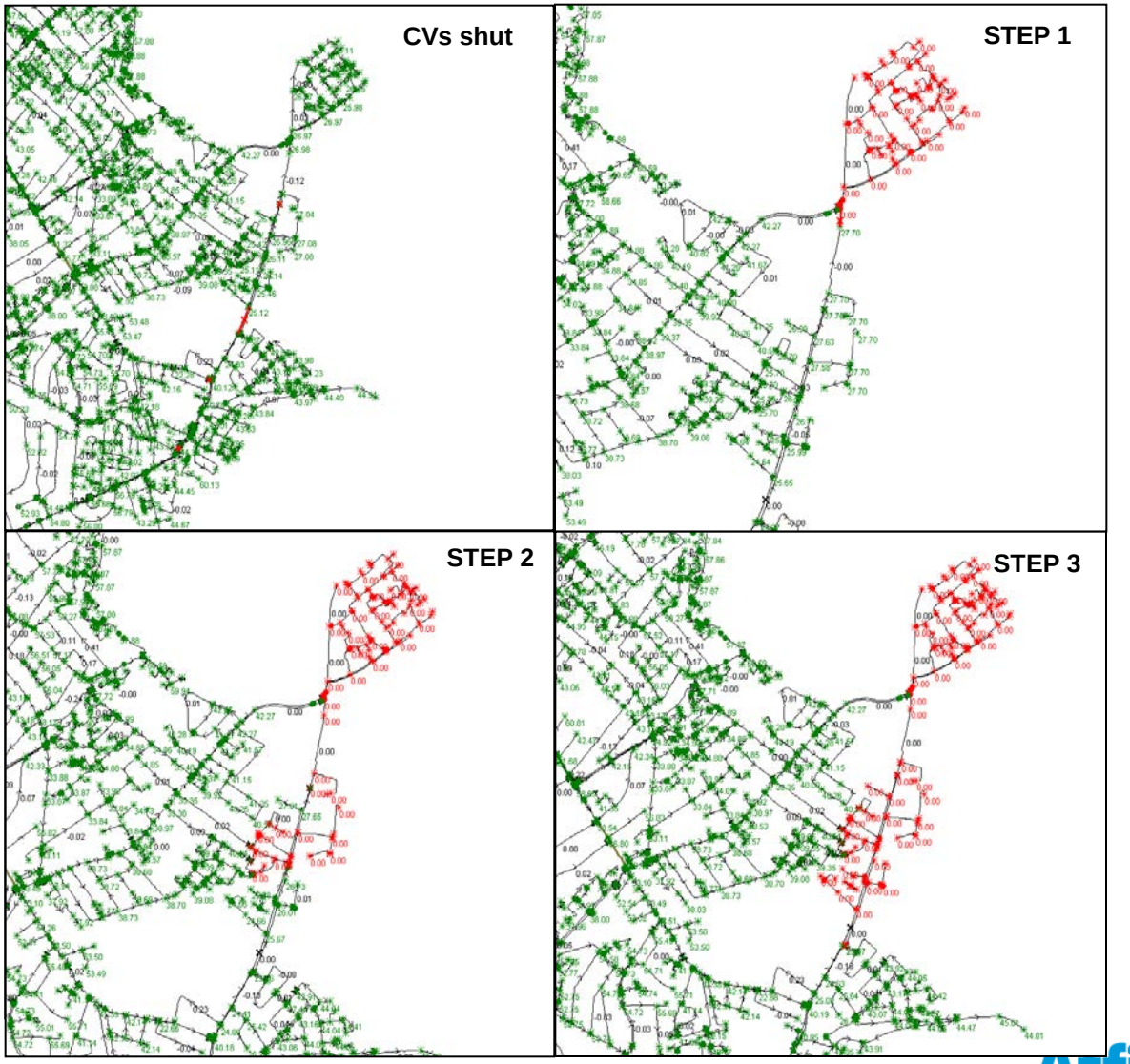
Step Test analysis

This method targets leakage in certain parts of DMA by isolating part of DMA and at the same time observing flow at the inlet



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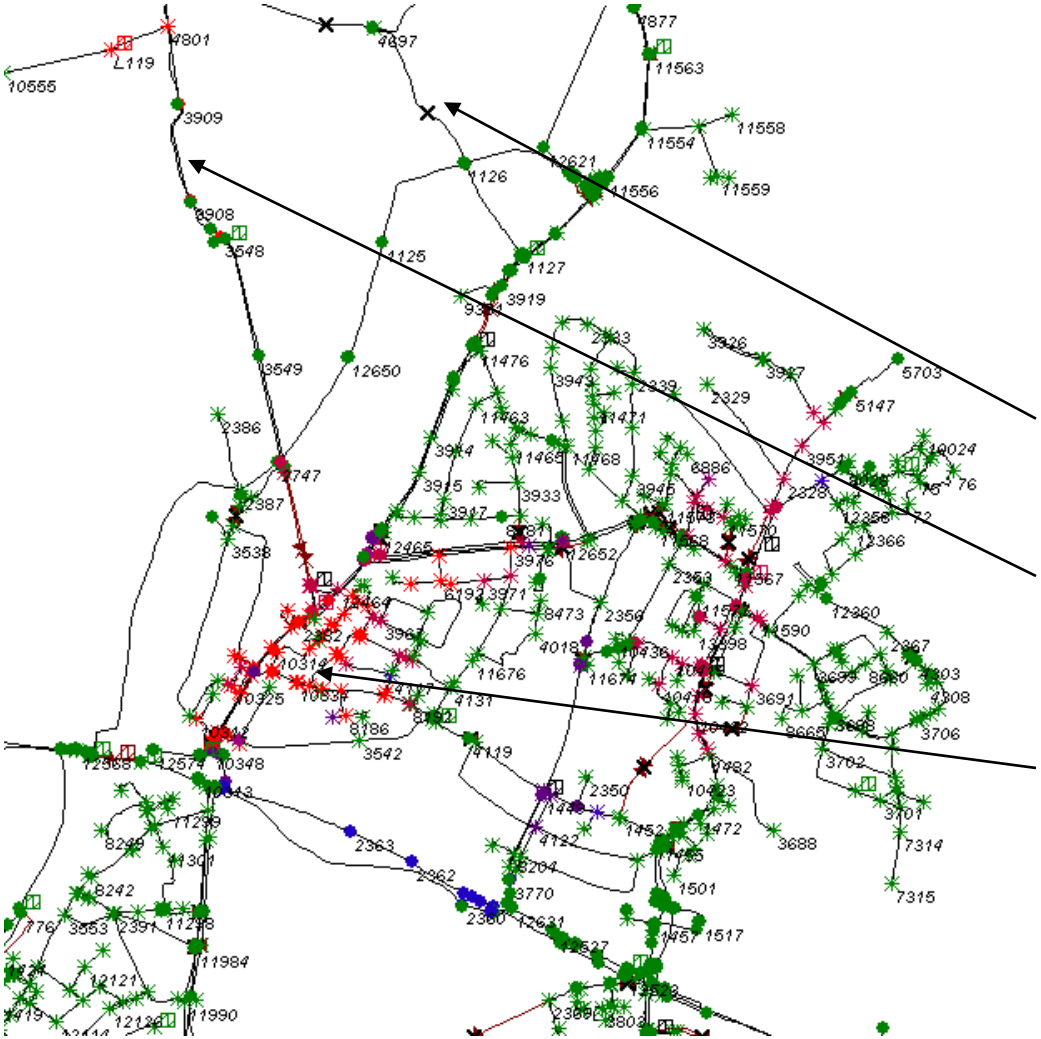
Water Quality
Contaminant tracing



Tracing of Contaminants

Trunk main shut here

Velocity increased here causing pick up of material

Material was then spread through the system

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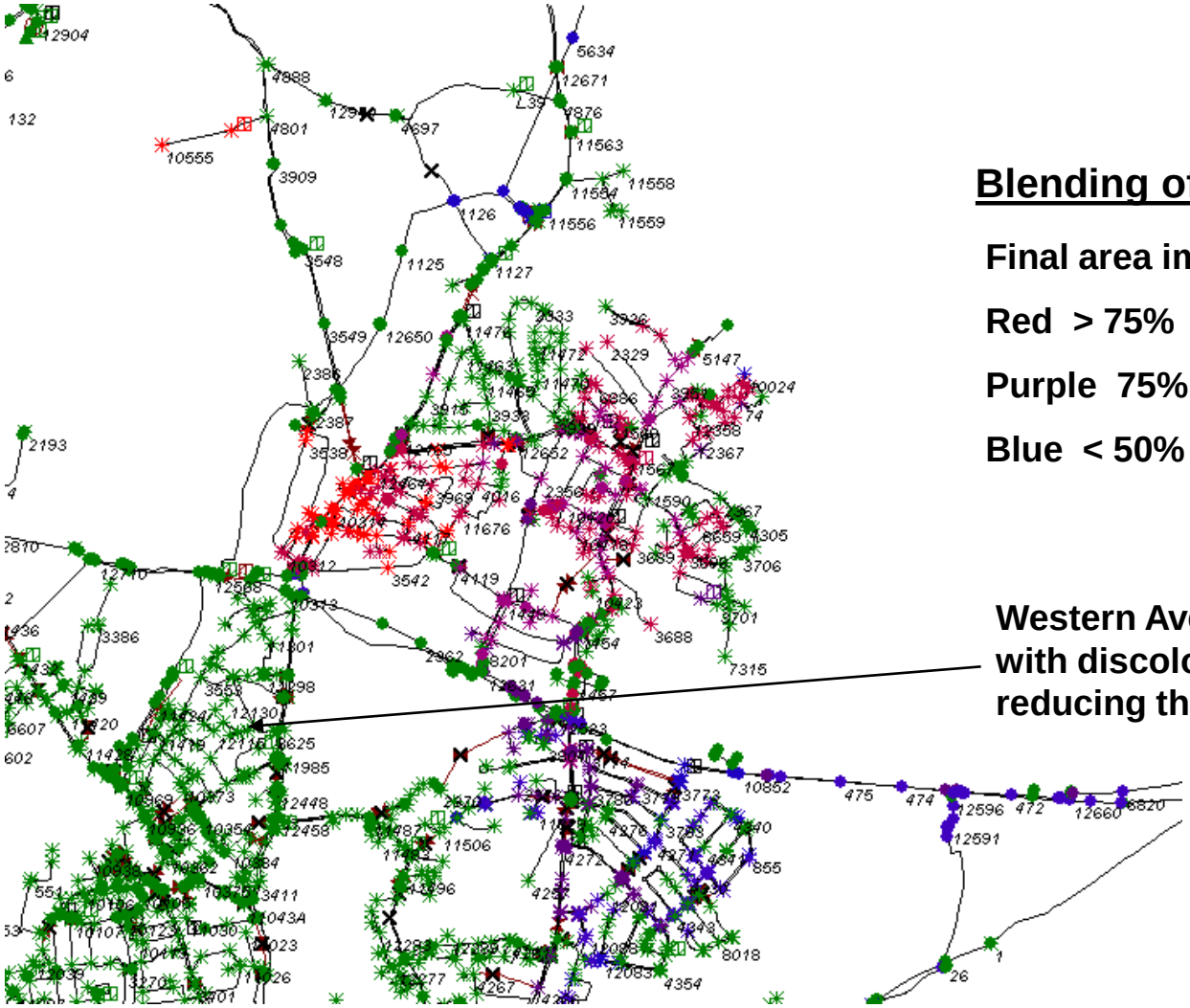
Water Quality
Source Blending



Blending of Water

Final area impacted

Red > 75%

Purple 75% - 50%

Blue < 50%

Western Avenue blends with discoloured water reducing the impact

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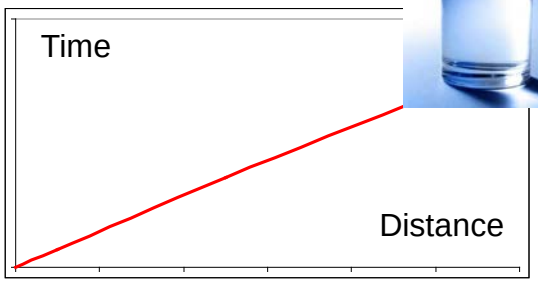
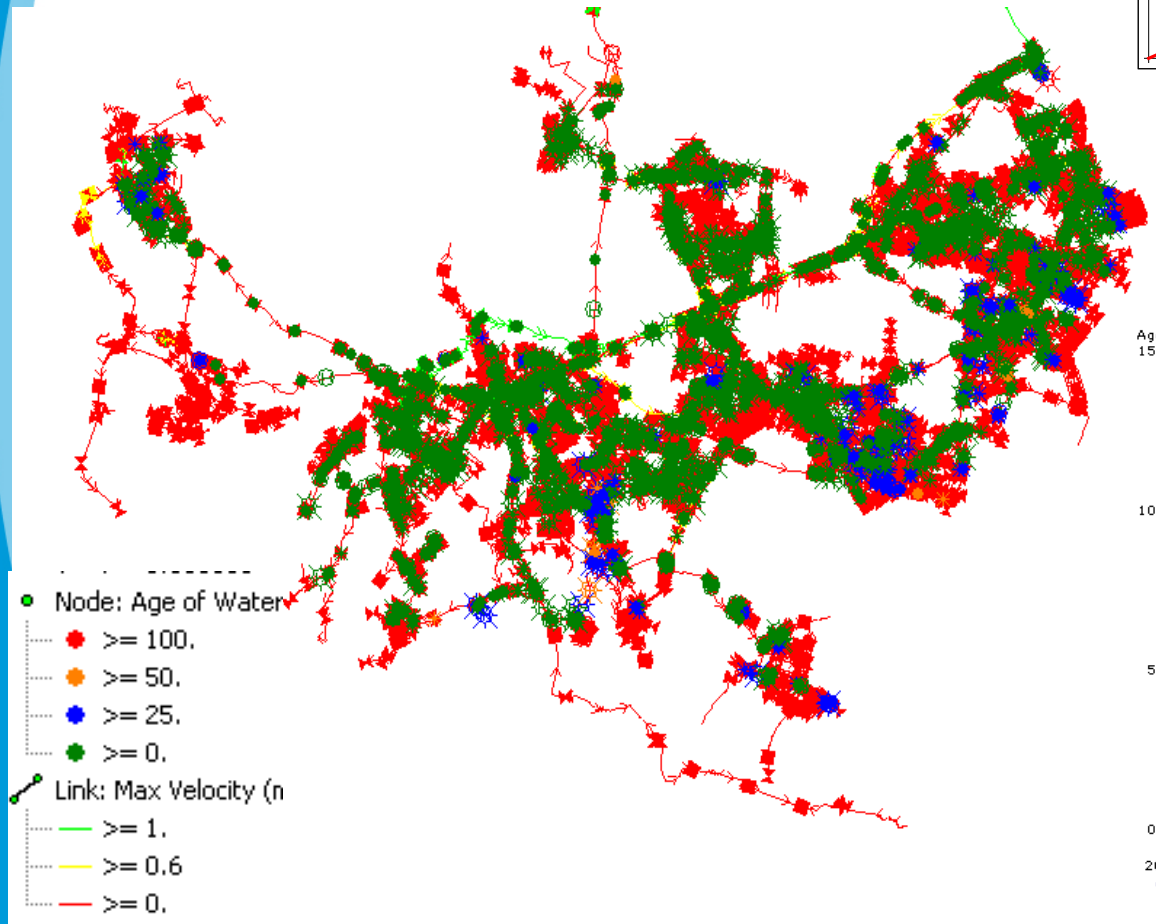
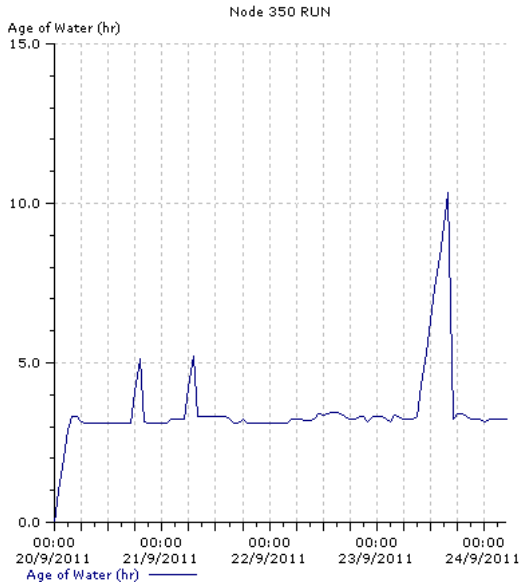
Water Quality
Age of Water







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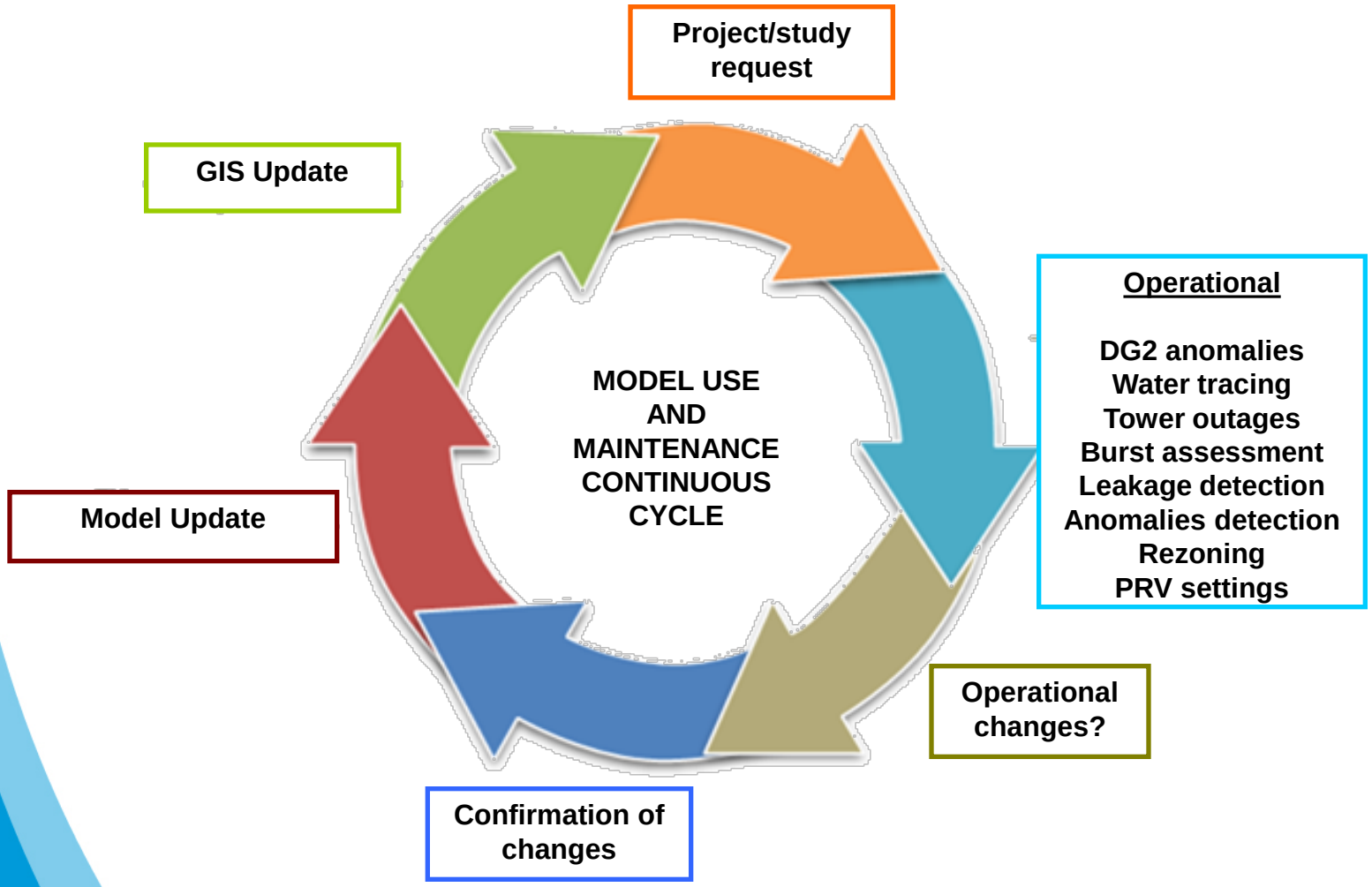
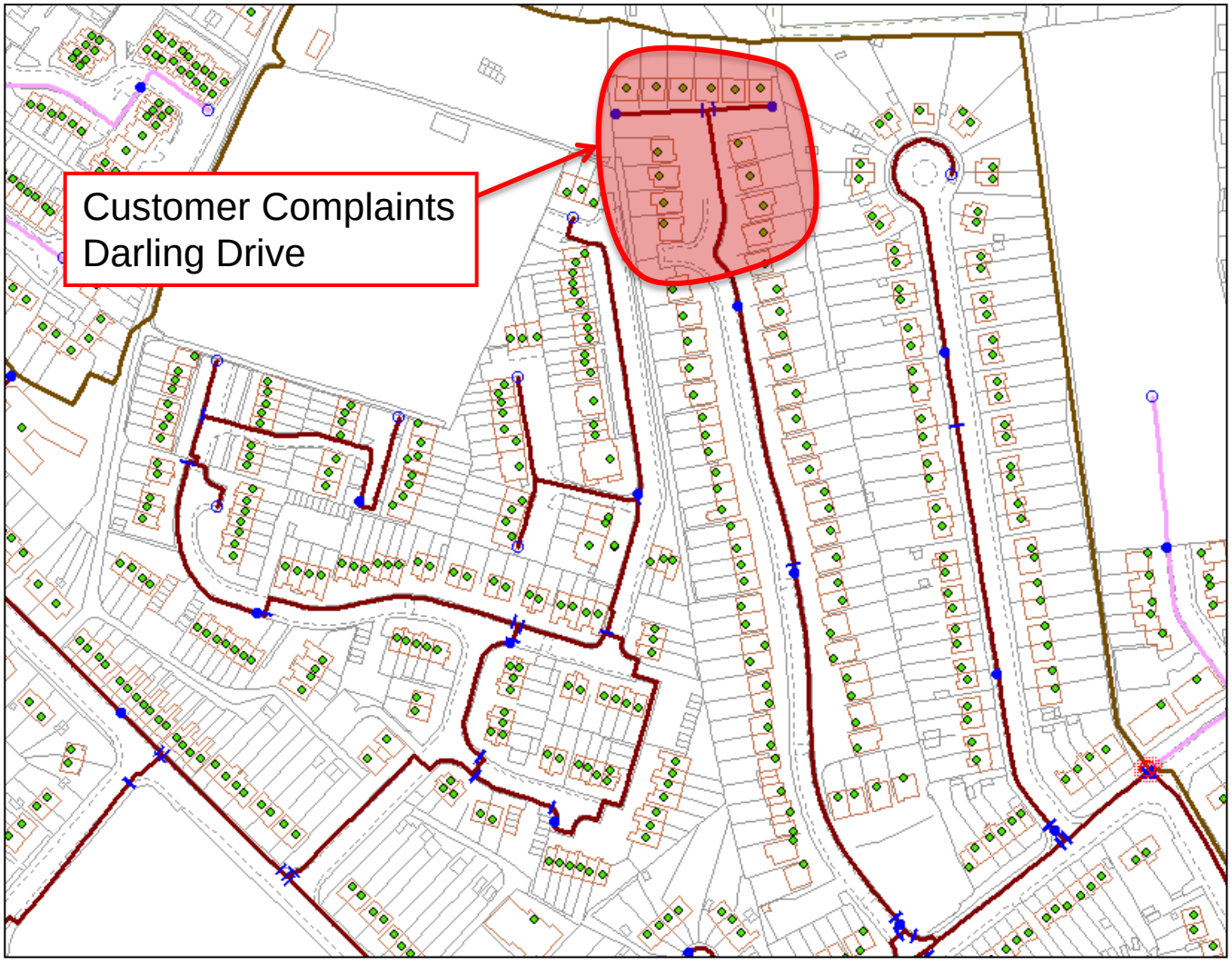
Hydraulic Modelling Process

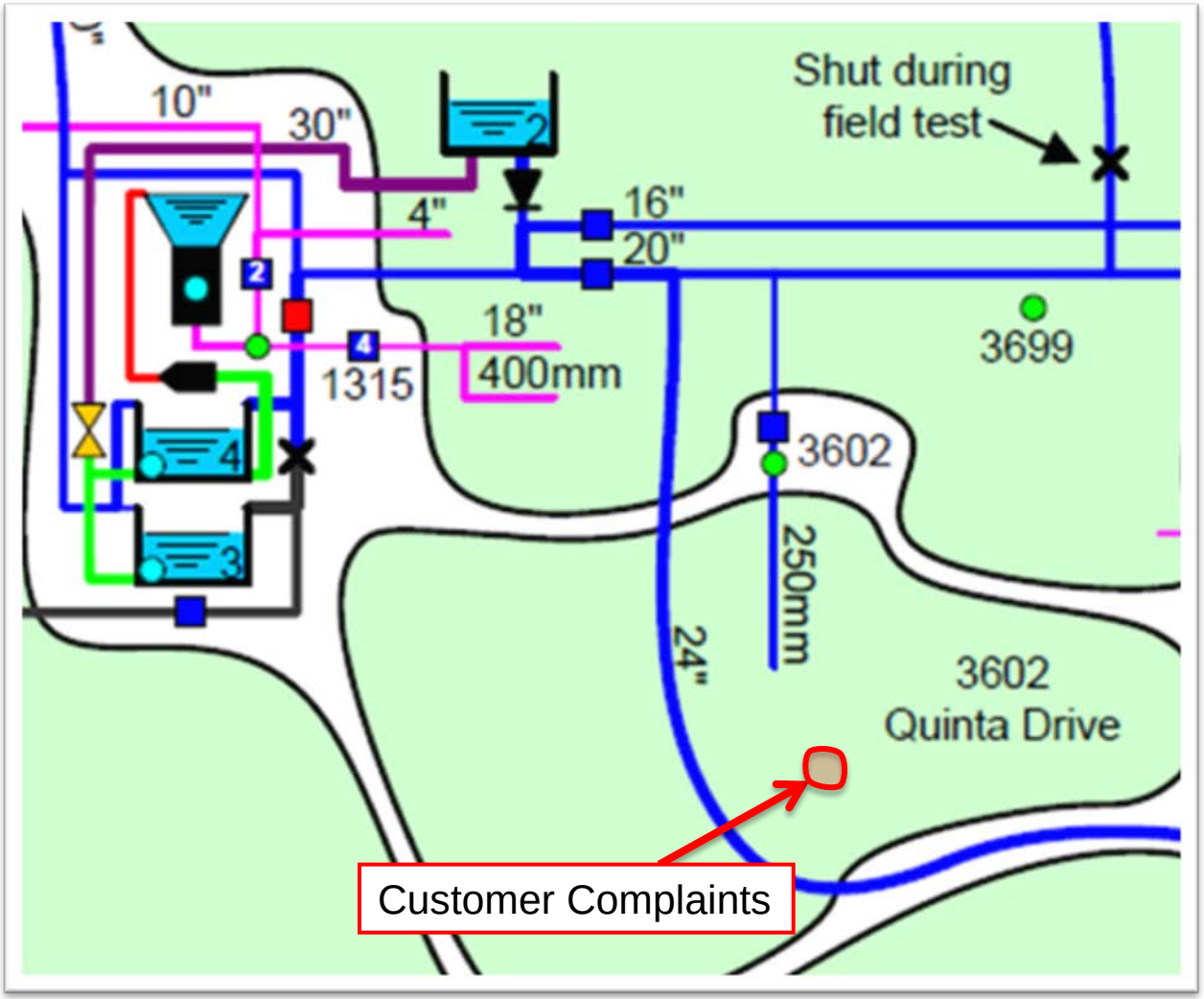


CASE STUDY
Poor Pressure Complaint in Arkley

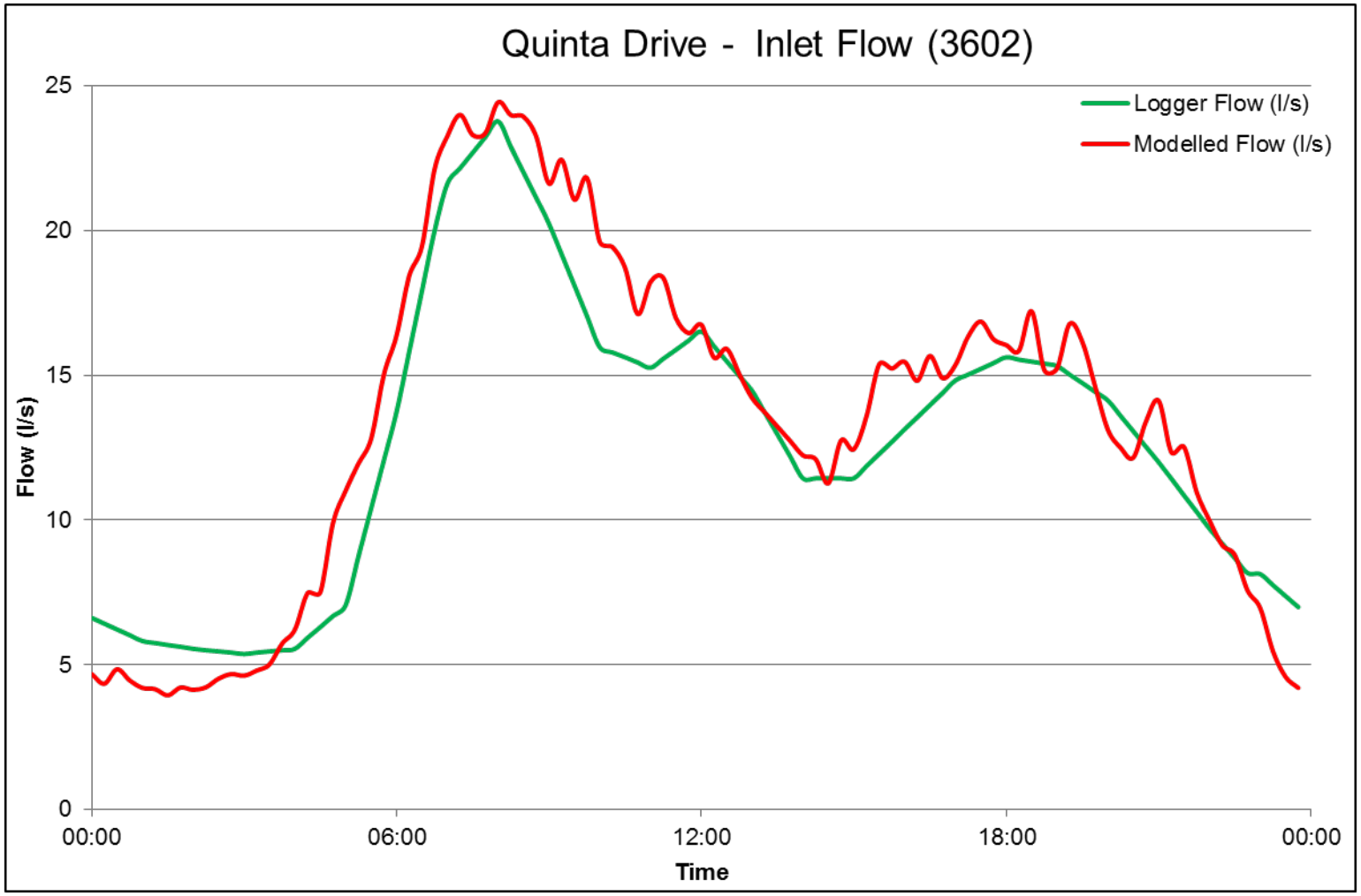
Location of Customer Complaint



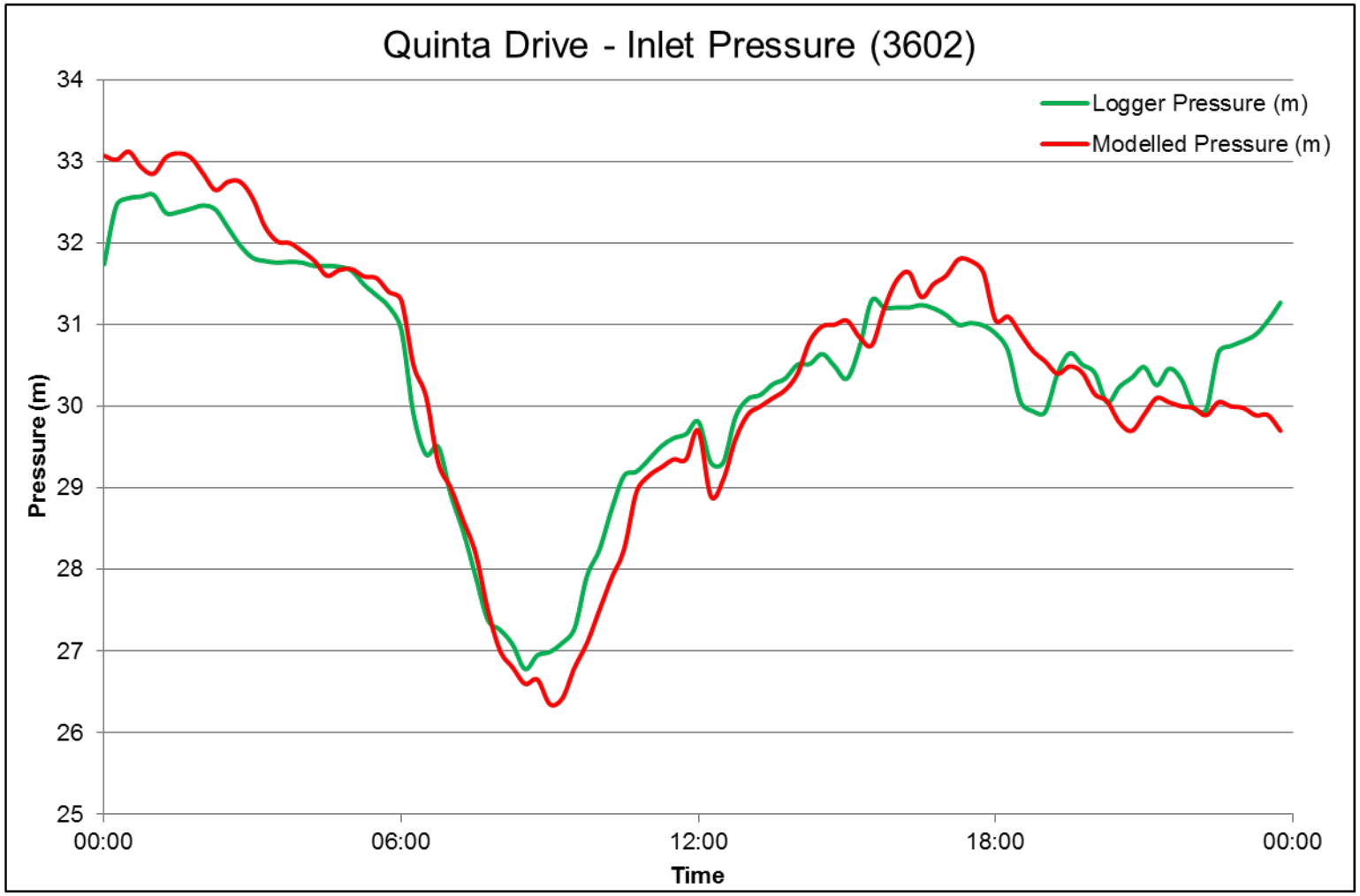
Schematic - Location



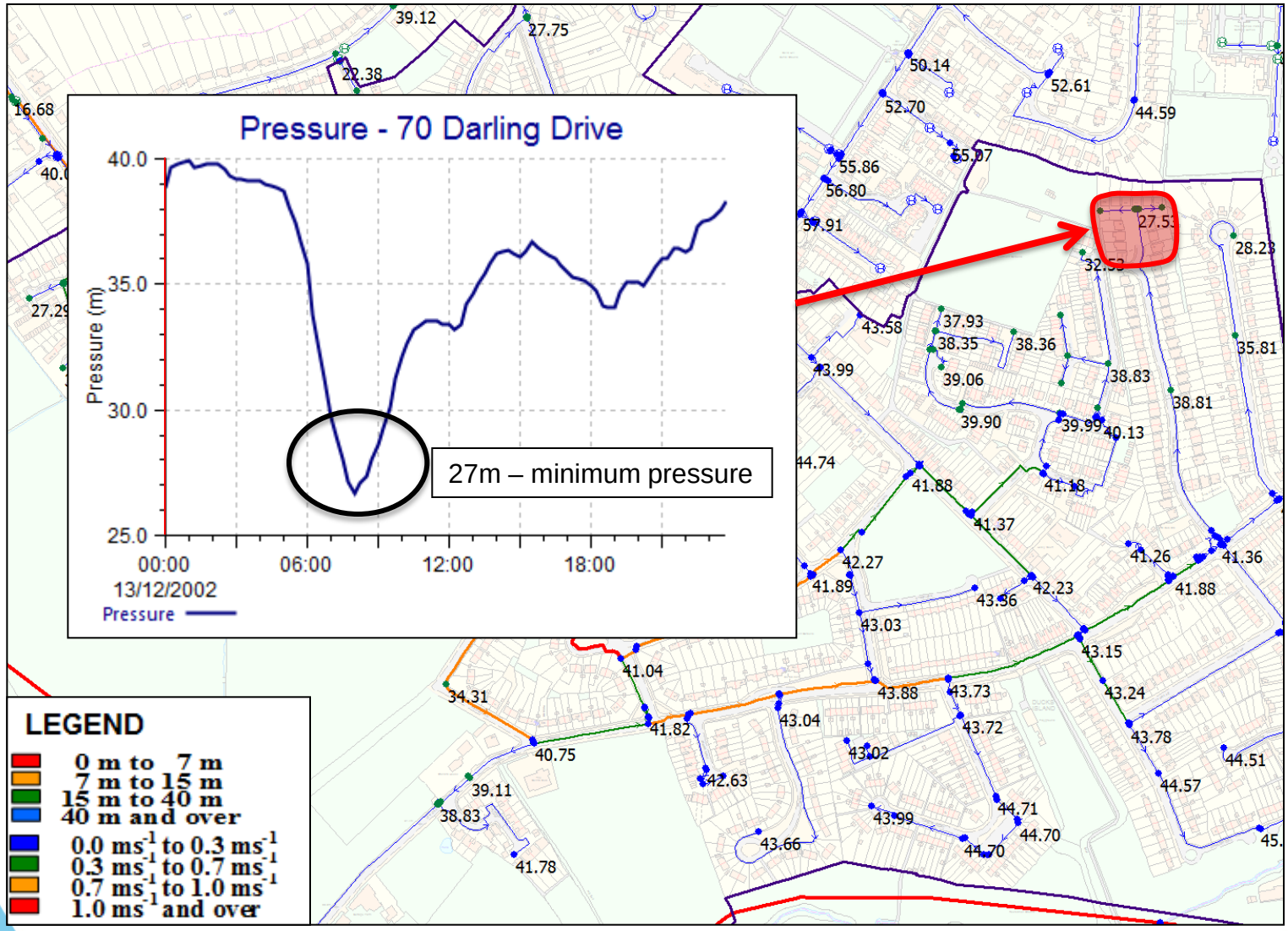
Confidence in Model



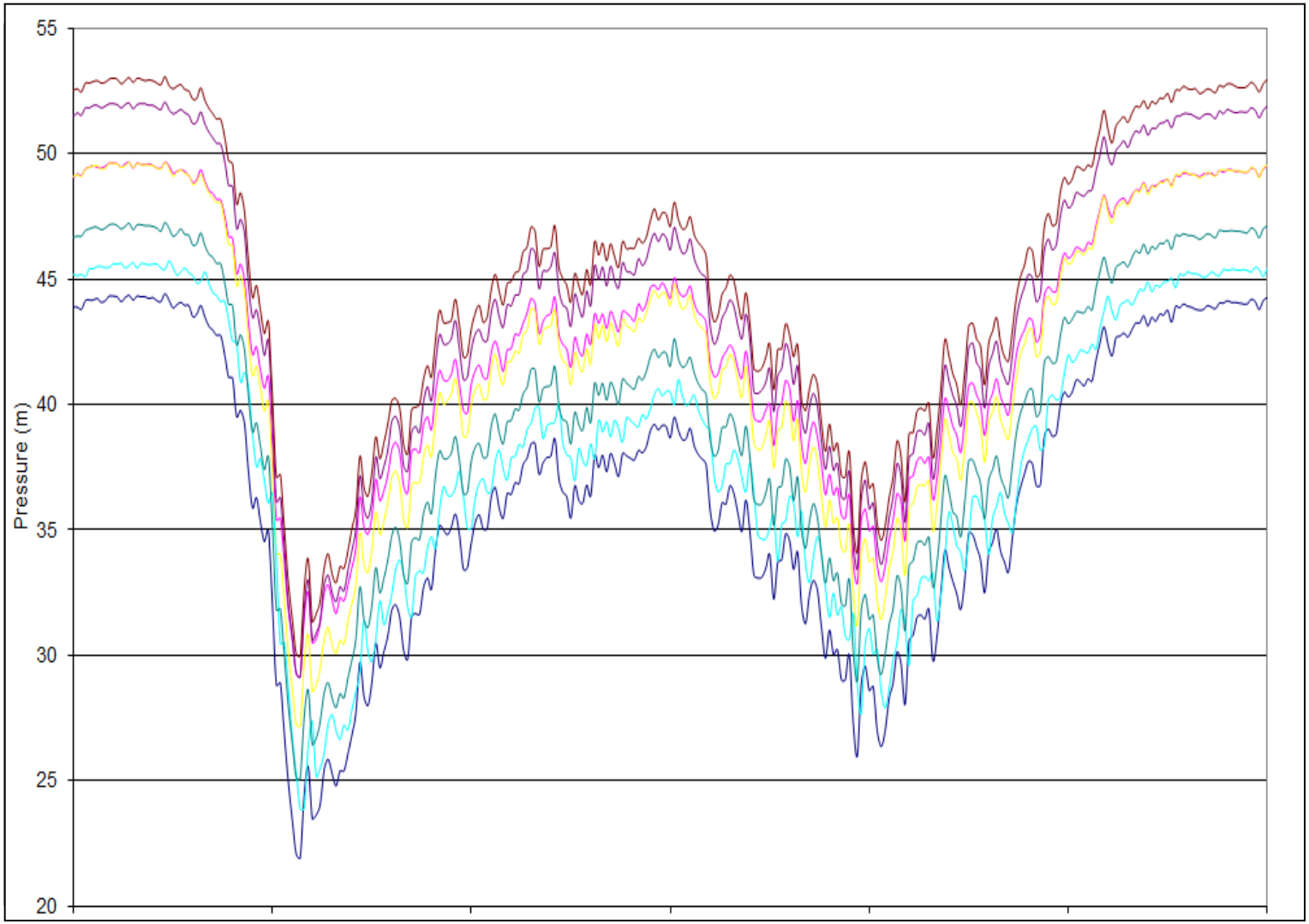
Confidence in Model



Model Results



Logger Installation



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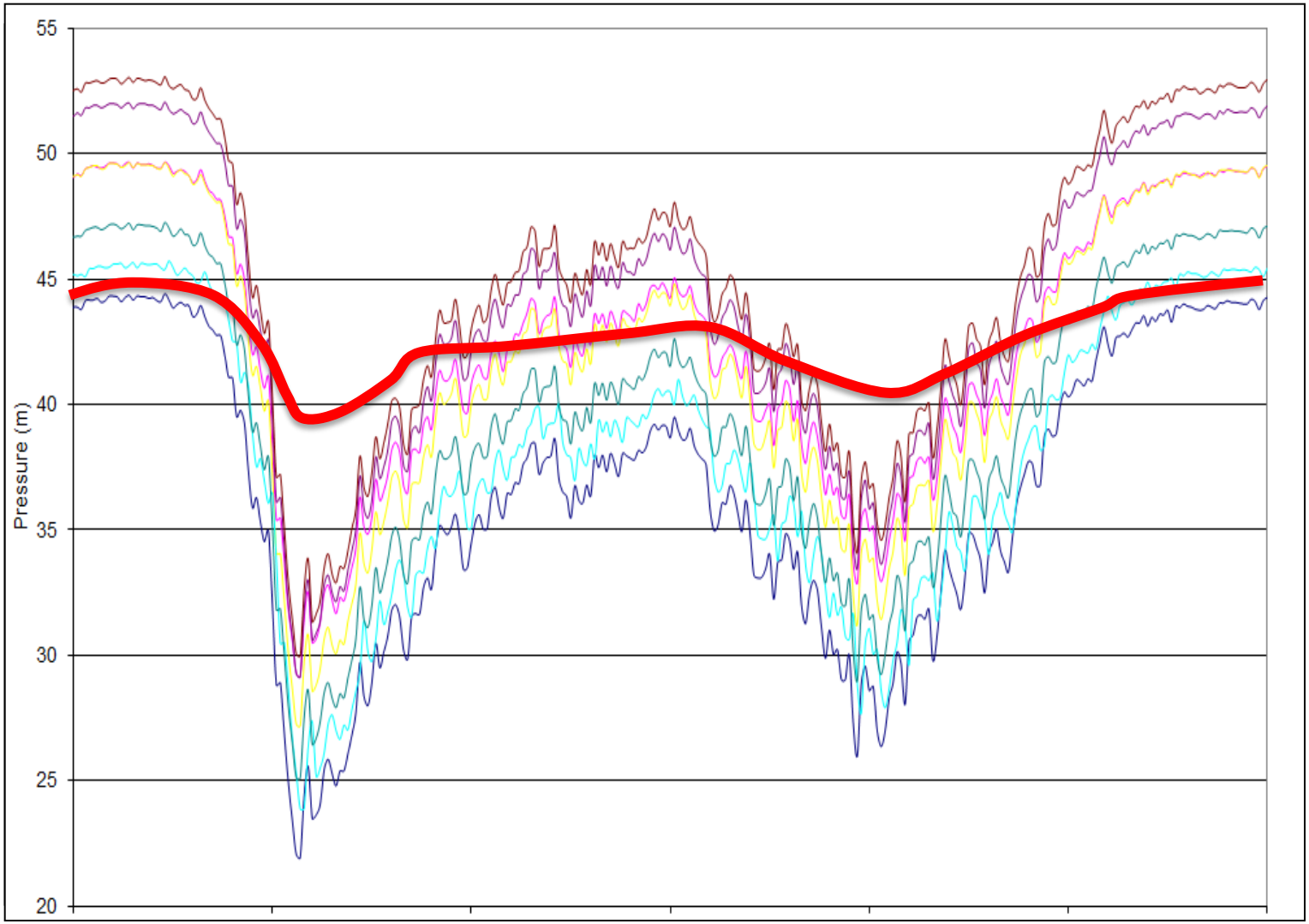

Network Restriction Identified

Questions