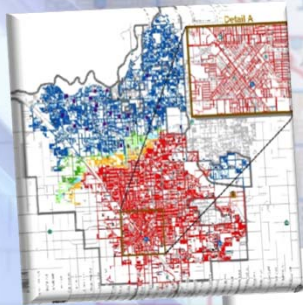


CapPlan Isolation and Outage Analysis

Tony Akel, PE
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Agenda

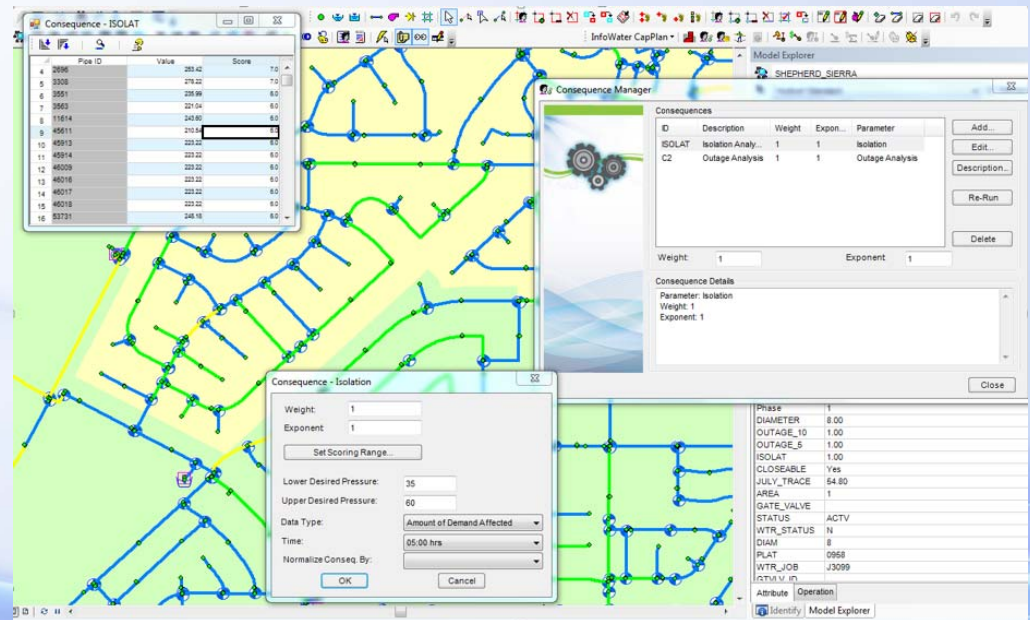
- Purpose
- Isolation Analysis
- Outage Analysis
- Questions

Agenda

- Purpose
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CapPlan Overview

- Risk Management tool
- Identify Likelihood and Consequence of Failure



Purpose of Isolation and Outage

- Identify system vulnerabilities
- Risk Metric
- Prioritizing Capital Costs

Assess Risk

Risk Assessment Method

Linear Normalization Classification

Bi-Directional Distribution

Multi-Criterion Classification

Risk Boundary Option

Percentage

Score

Conseq. Lower Boundary(%): 30

Conseq. Upper Boundary(%): 60

LOF Lower Boundary(%): 30

LOF Upper Boundary(%): 60

Set Risk Profile Boundary

	Likelihood of Failure - Low	Likelihood of Failure - Medium	Likelihood of Failure - High
Consequence - High	Medium	High	Extreme
Consequence - Low	Low	Medium	High

Consequence Manager

Description	Weight	Expon...	Parameter
Isolation	1	1	Isolation
Outage Analysis	1	1	Outage Analysis

Weight:

Exponent:

Consequence Details

Close


Agenda

- Purpose
- **Isolation Analysis**
- Outage Analysis
- Questions

Isolation Analysis Summary

Consequence

- Analysis Results
- Population Density
- Critical Facilities
- Outage Analysis
- Isolation
- Fire Flow
- Street Paving
- Intersection
- Pipe Inventory Data
- Advanced GIS Field Calculation



Descriptions

How isolation of an individual failed pipe (including all connected pipes to the closest isolation valves) affects the scale of impact of any potential water distribution system failures. (e.g., isolation of one pipe might cause a large part of the network to fall below a minimum desired pressure but isolation of another pipe might not have much effect on hydraulic performance)

- Quantifies impact of isolating specific water mains

Isolation Analysis

Required Input

Define Closable Pipes

Closable Pipes

Domain

Connected to Valves on External Layer

Valve Layer: WaterValve

Pipe ID Field: PLAT

- Requires specification of closable pipes.
- Closable pipes can be specified manually or automatically by using a shapefile

Isolation Analysis

Consequence of Failure

- Defining acceptable pressure parameters
- Classifying desired consequence
 - Demand
 - Number of Pipes

Consequence - Isolation

Weight: 1

Exponent: 1

Set Scoring Range...

Lower Desired Pressure: 35

Upper Desired Pressure: 60

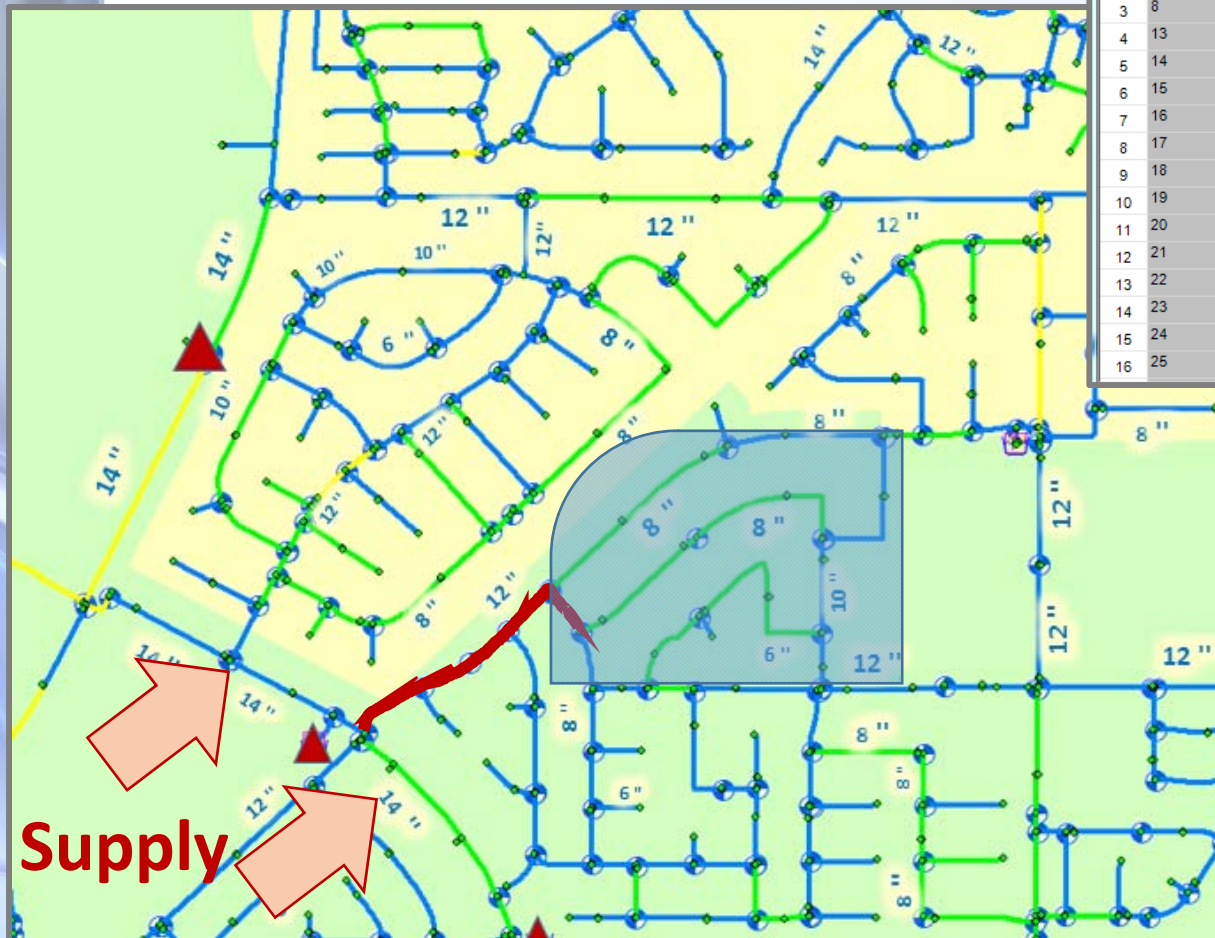
Data Type: Amount of Demand Affected

Time:

Normalize Conseq. By:

OK Cancel

Isolation Analysis Results



Consequence - ISOLAT

	Pipe ID	Value	Score
1	6	3.94	1.0
2	7	11.19	1.0
3	8	0.58	1.0
4	13	1.33	1.0
5	14	1.33	1.0
6	15	1.33	1.0
7	16	0.00	1.0
8	17	0.00	1.0
9	18	7.77	1.0
10	19	7.77	1.0
11	20	7.77	1.0
12	21	9.10	1.0
13	22	9.10	1.0
14	23	0.00	1.0
15	24	0.00	1.0
16	25	0.00	1.0

Agenda

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- **Outage Analysis**
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Outage Analysis Summary

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Analysis Results

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Descriptions

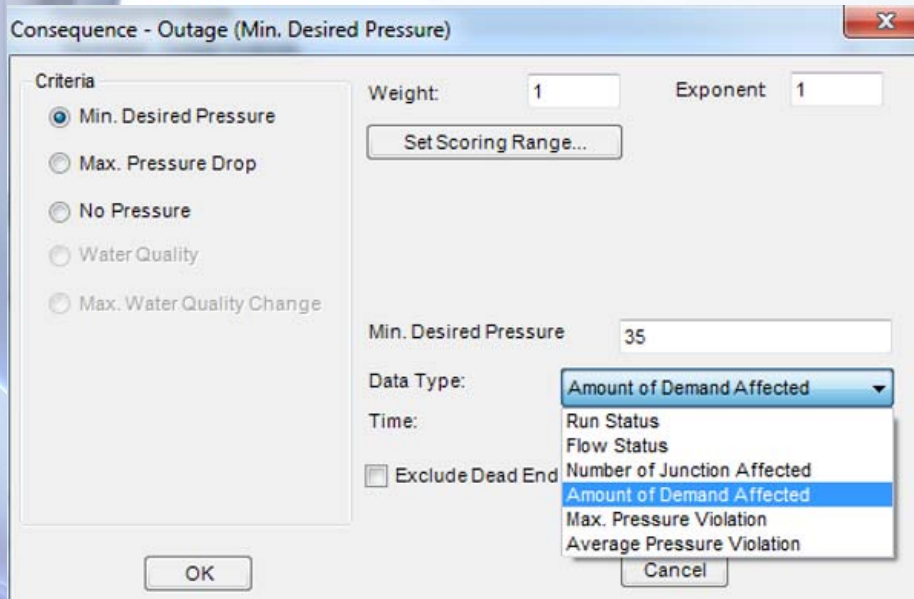
How individual pipe failure affects the hydraulic and water quality performance of the rest of the network can be used to calculate the consequence of failure. (e.g. A failure of one pipe might cause a large part of the network to fall below a minimum desired pressure but another pipe failing might not have much effect on hydraulic performance)

OK Cancel

- Quantifies hydraulic or water quality impact of water main failure

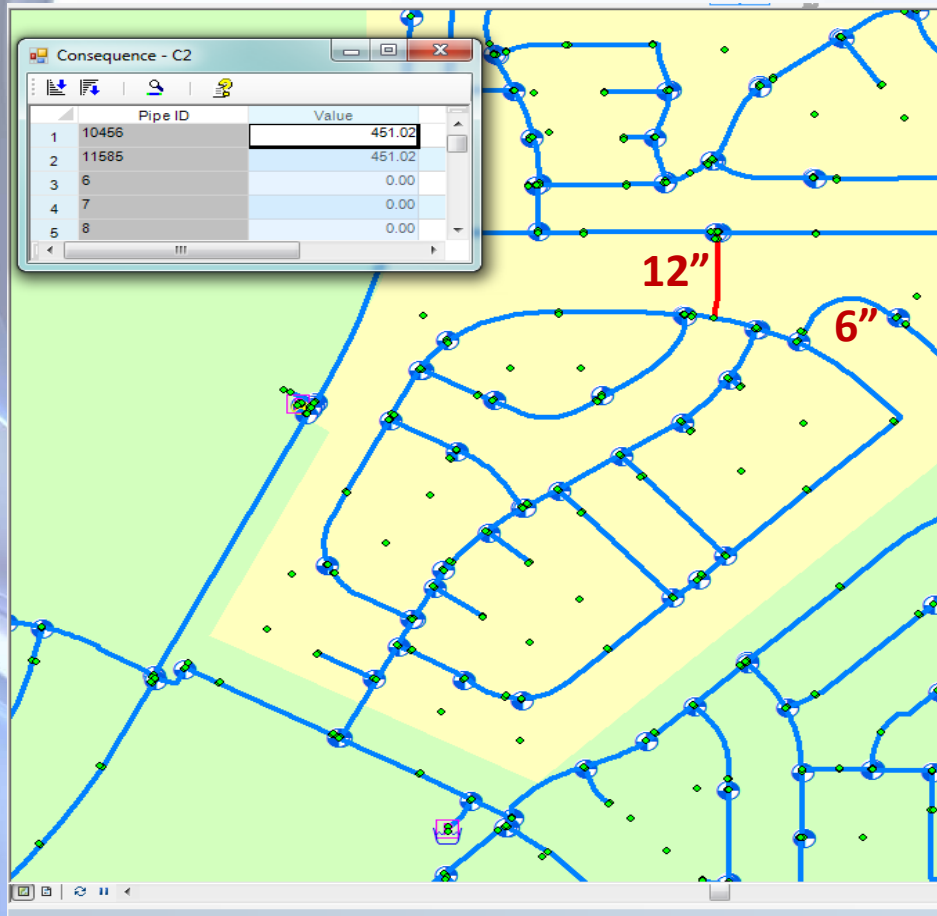
Outage Analysis

Consequence of Failure



- Consequence Criteria:
 - Minimum pressure
 - Maximum pressure drop
 - No pressure (dead-end mains)
 - Water quality
 - Maximum change in water quality

Outage Analysis Results



- Results summarize impact of pipe failure

CapPlan Isolation and Outage Analysis

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