



From Digital Doodle to Digital Twin: A Strategic Approach to Utility Mapping

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Paratum Solutions
President

NCTCOG Regional GIS Meeting
May 13, 2025



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SOLUTIONS**



PARATUM SOLUTIONS

Paratum Solutions drives organizations to be proactive, rather than reactive.

“Paratum” is a derivation of the Latin word for “prepared.”

**PREPARED
INFORMED
EQUIPPED**

Geospatial Consultation & Implementation

- Needs Assessments
- GIS Support Services
- Facilities and Asset Management
- Mobile Field Applications
- Data Conversion/Management



Quick Poll

Where are you on your
utility mapping journey?



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My Goal Today:

Give you an **actionable plan**
for you to use to
create your utility GIS dataset.

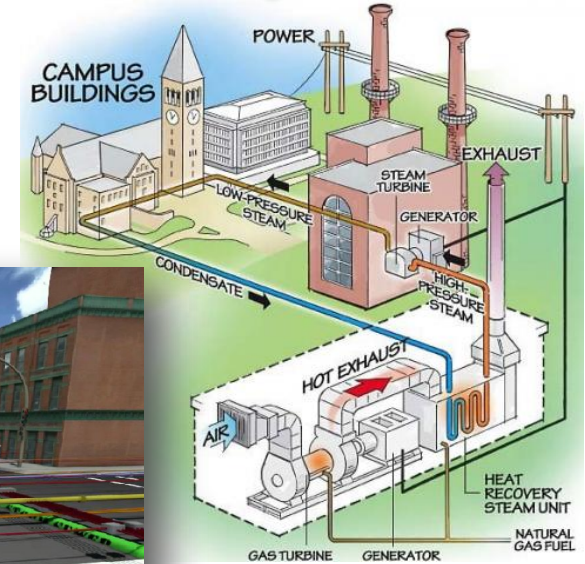
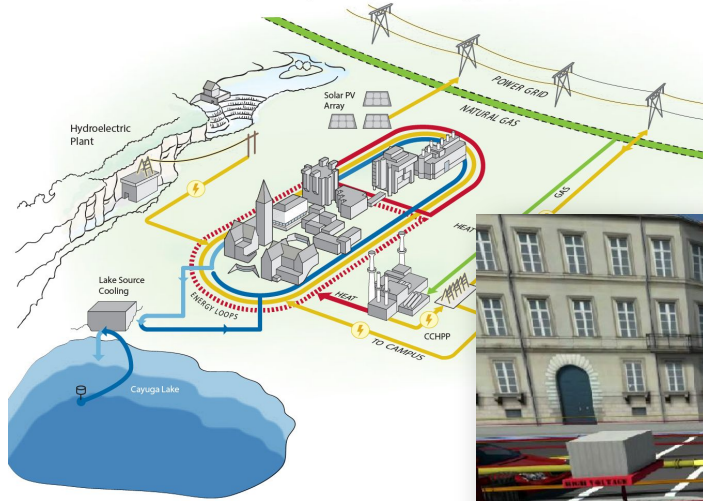


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Utilities are Lifelines of Cities and Campuses

Cornell University Campus Energy Systems



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New Potential Texas Legislation...

Texas House Bill 1335

All water and wastewater lines may soon be required to be mapped and reported to Texas811.

Effective September 1, 2025 if approved.



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Utility Issues



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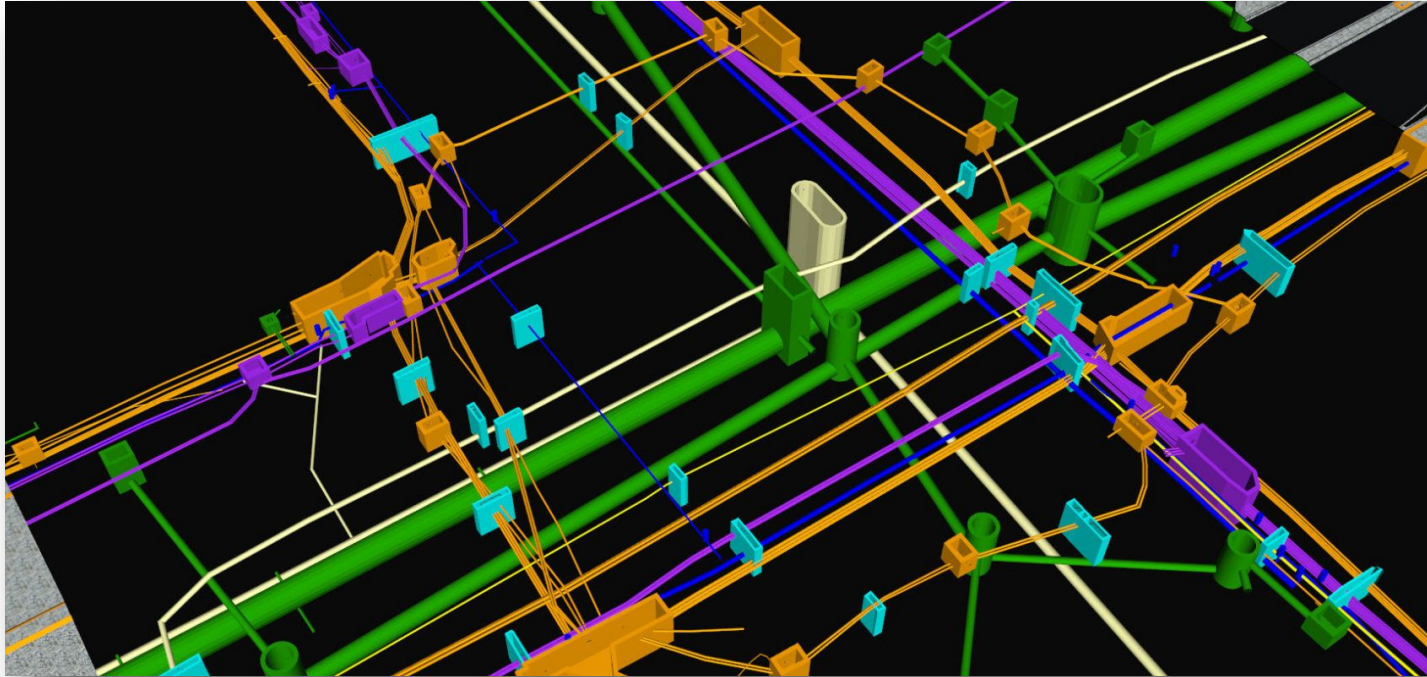
The Great “Digital Twin”



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The Dream of a Utility Digital Twin

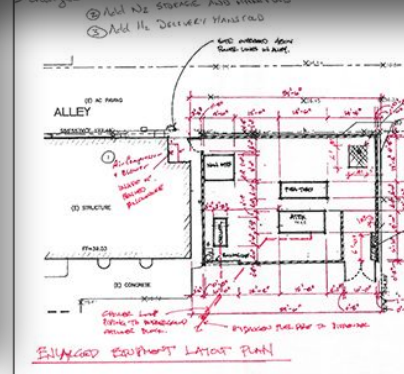
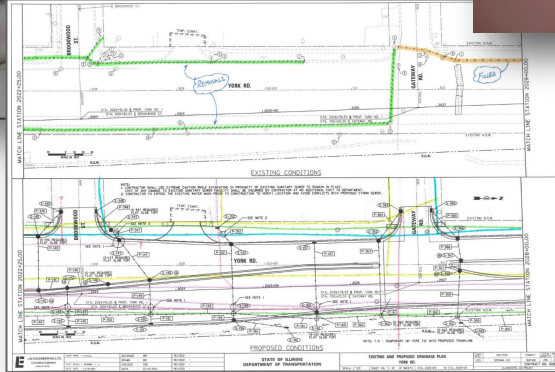


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Pre-Digital Utilities



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Digital Goal



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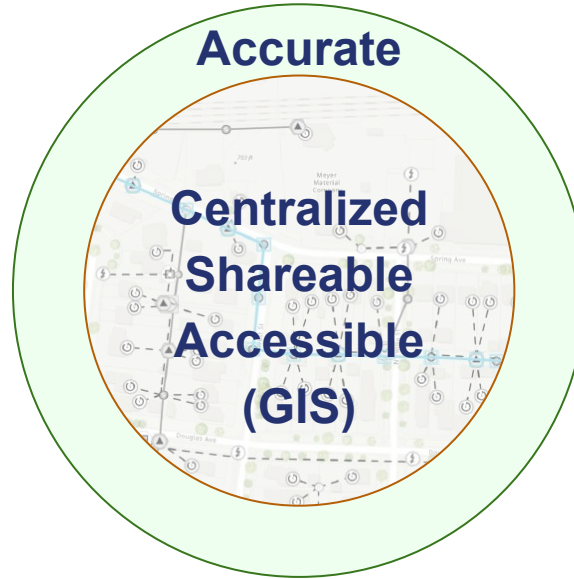
Digital Goal



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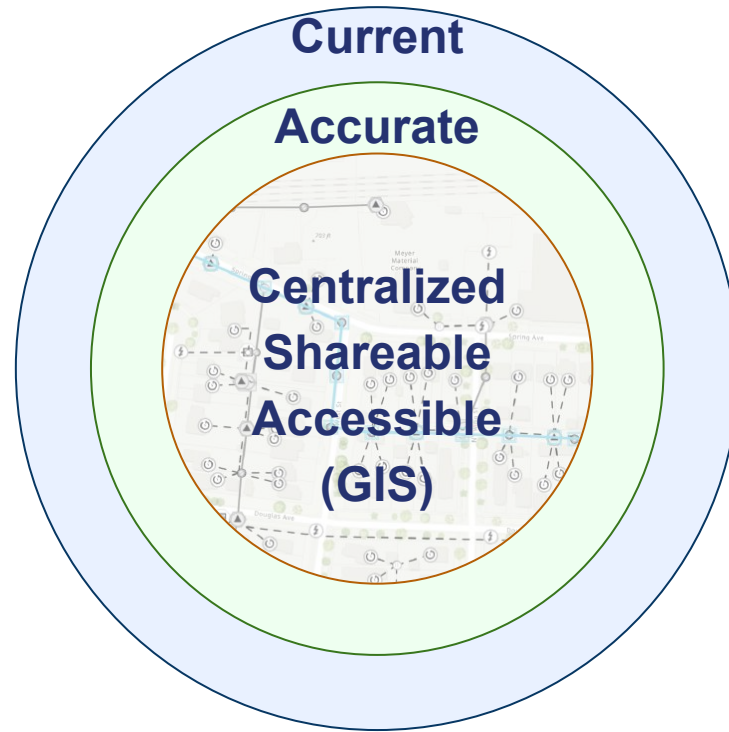
Digital Goal



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Digital Goal



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Subsurface Utility Engineering (SUE) Levels



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Don't Let Perfect Get in the Way of Better



Crawl —————> **Walk** —————> **Run**



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Don't Let Perfect Get in the Way of Better



Crawl —————> **Walk** —————> **Run**

QL-D —————> **QL-C** —————> **QL-B** —————> **QL-A**



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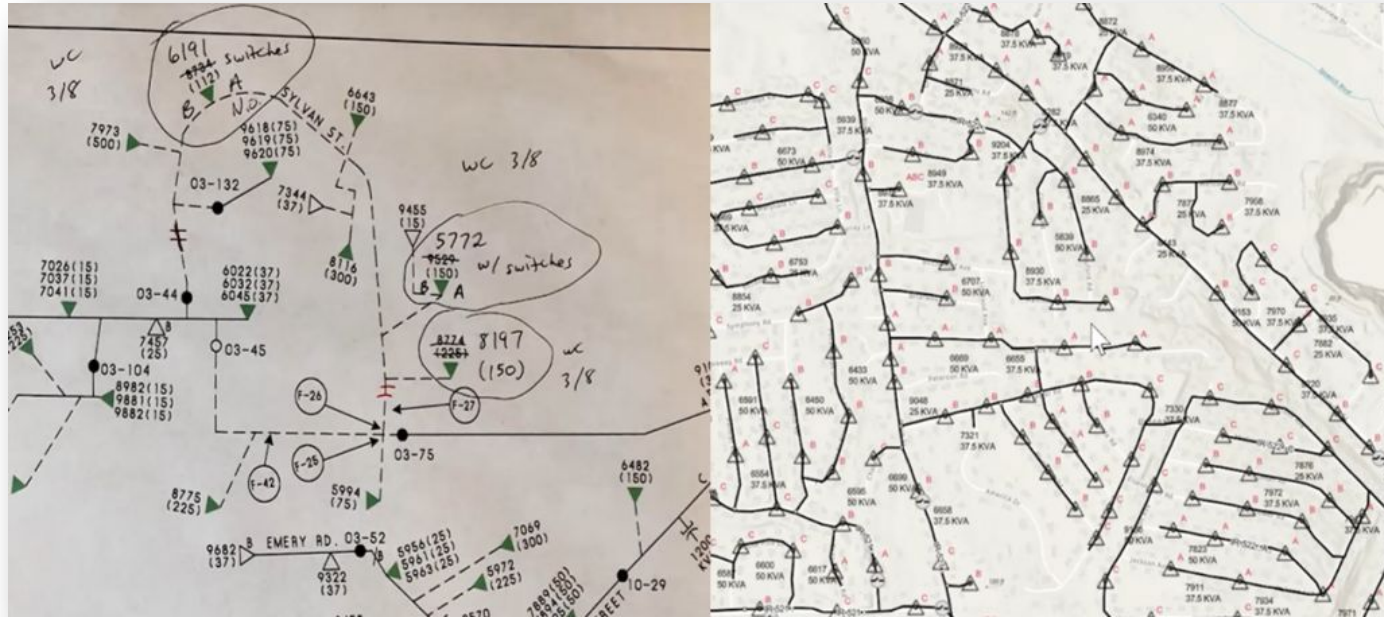
Starting with the Digital Doodle



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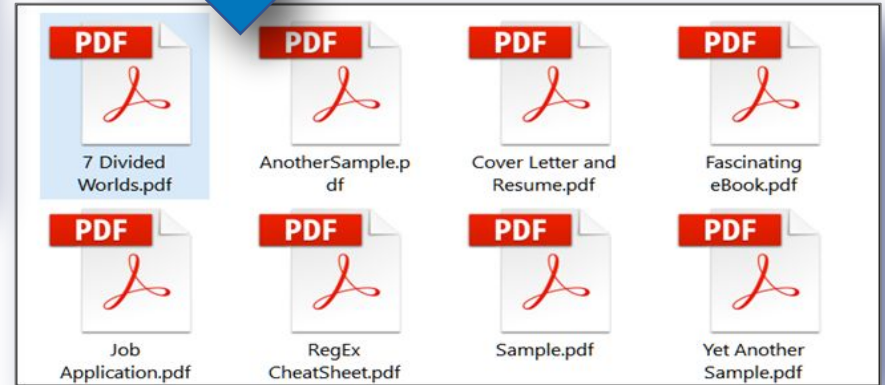


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Scan Your Plans!



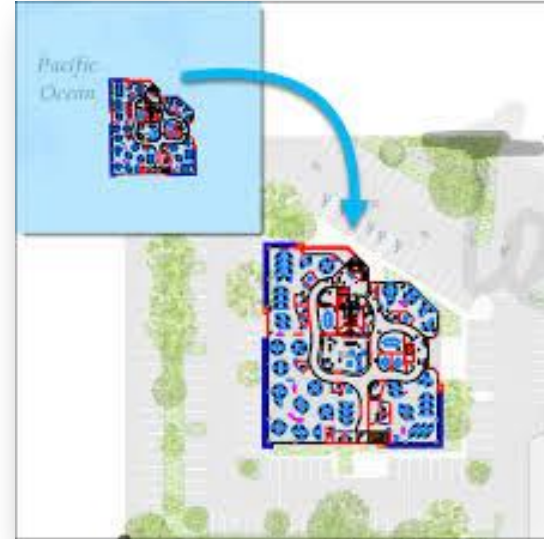
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Georeference in GIS

QL-D



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Create the Digital Doodle

QL-D



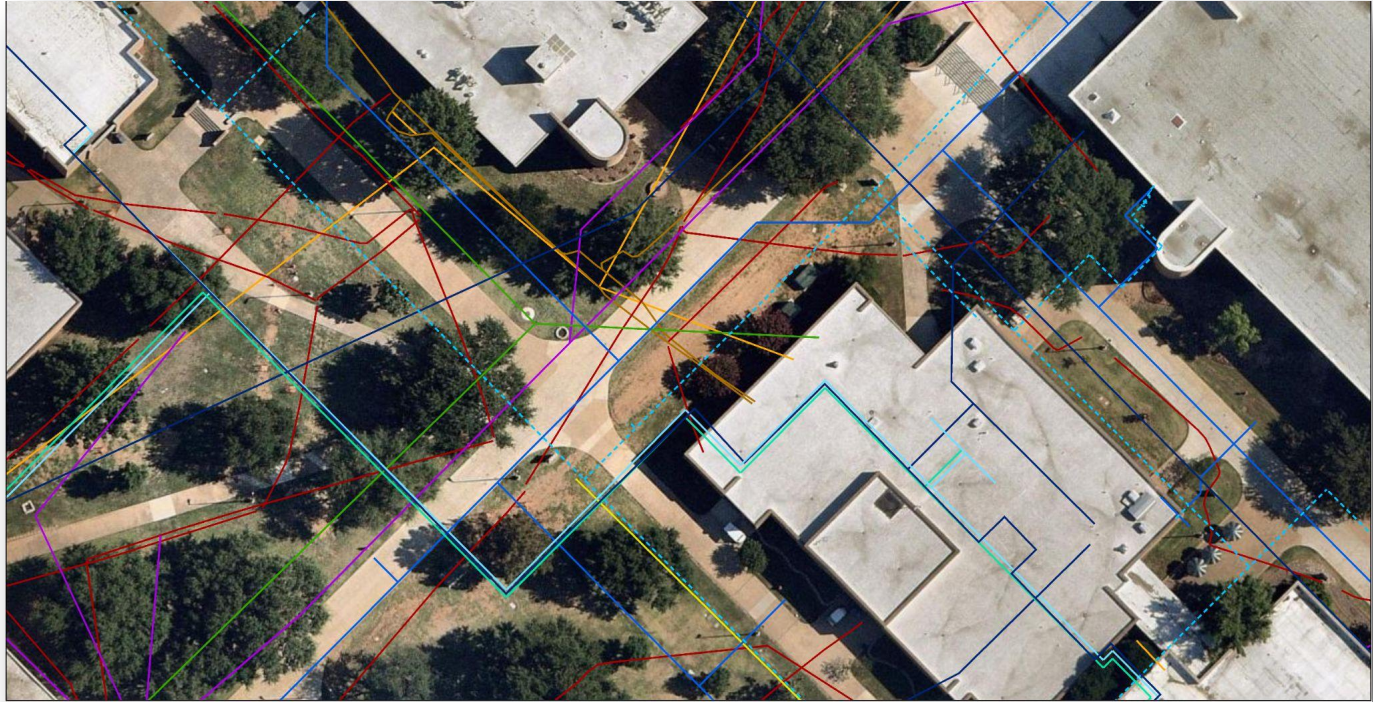
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Create Centralized, Digital Data

QL-D



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Empower with Mobile Access

QL-D



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Get Complaints Feedback!

QL-D



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Get Complaints Feedback!

QL-D



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Get Complaints Feedback!

QL-D

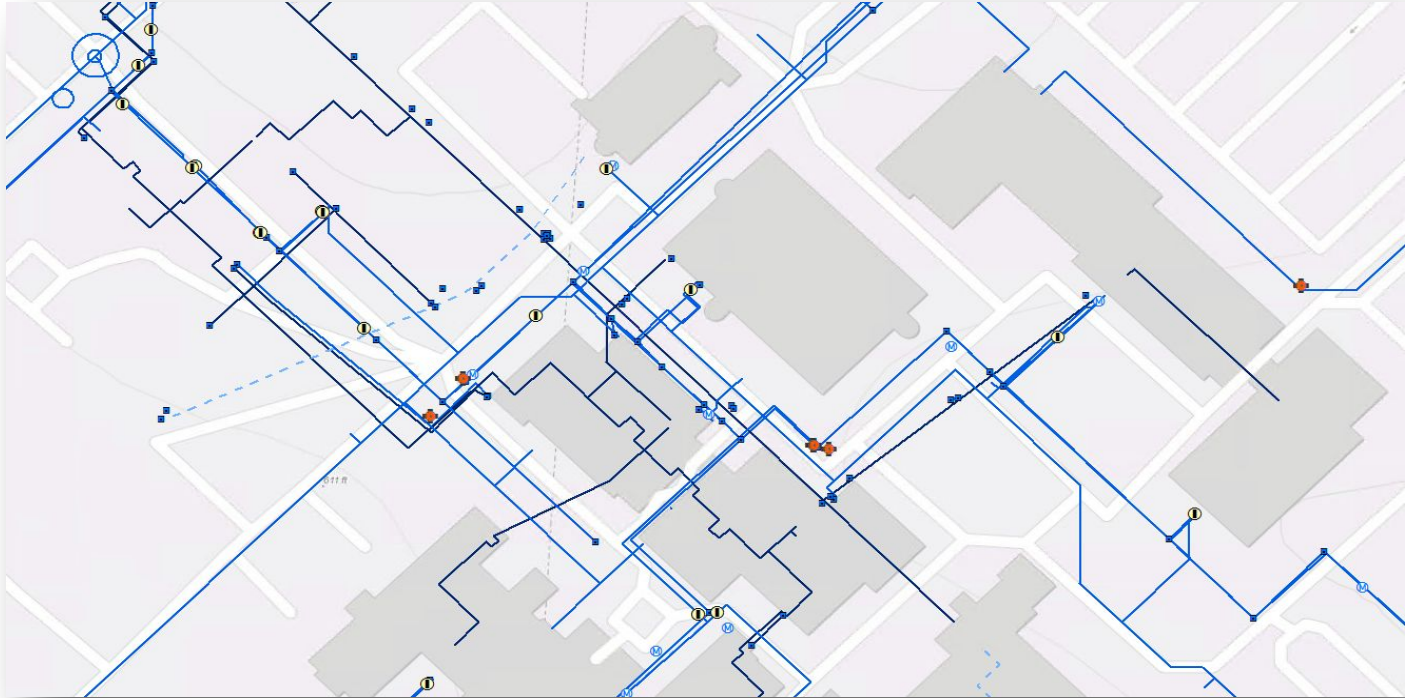


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Update with Feedback

QL-D



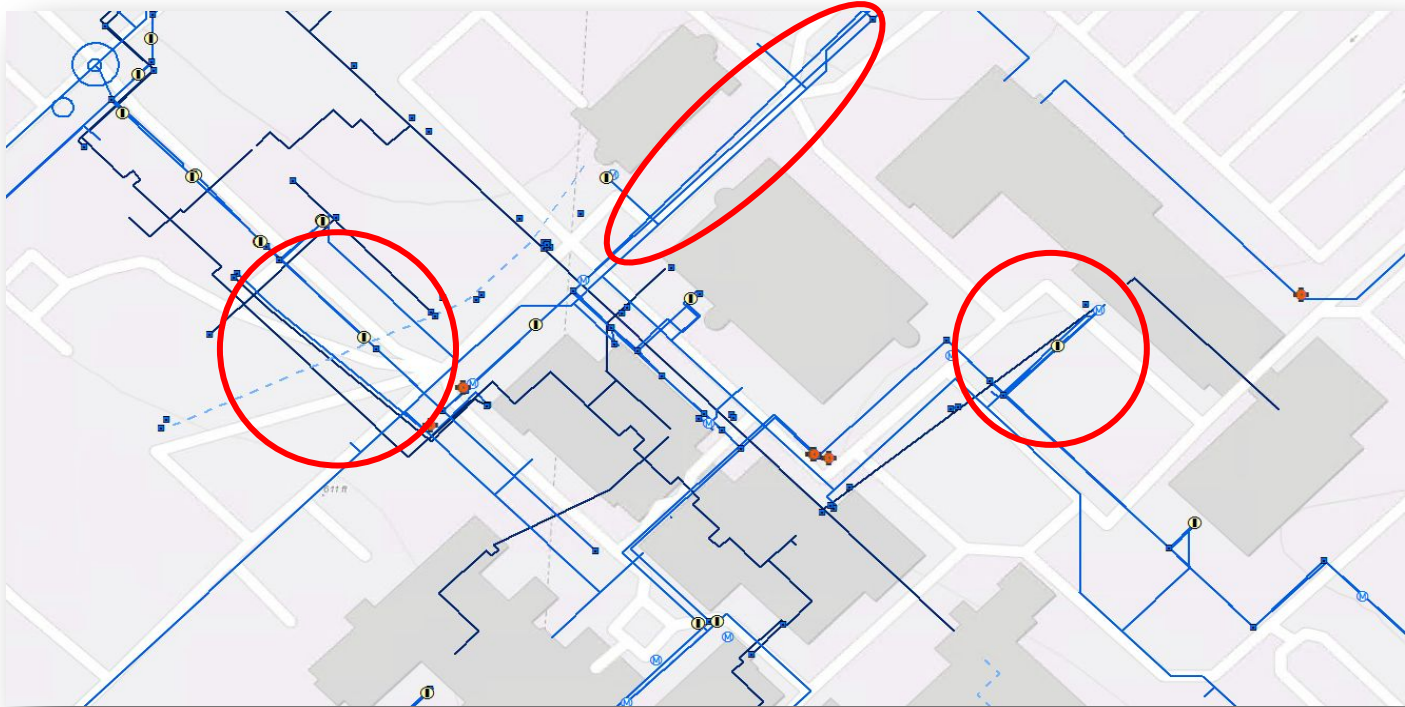
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Update with Feedback

QL-D



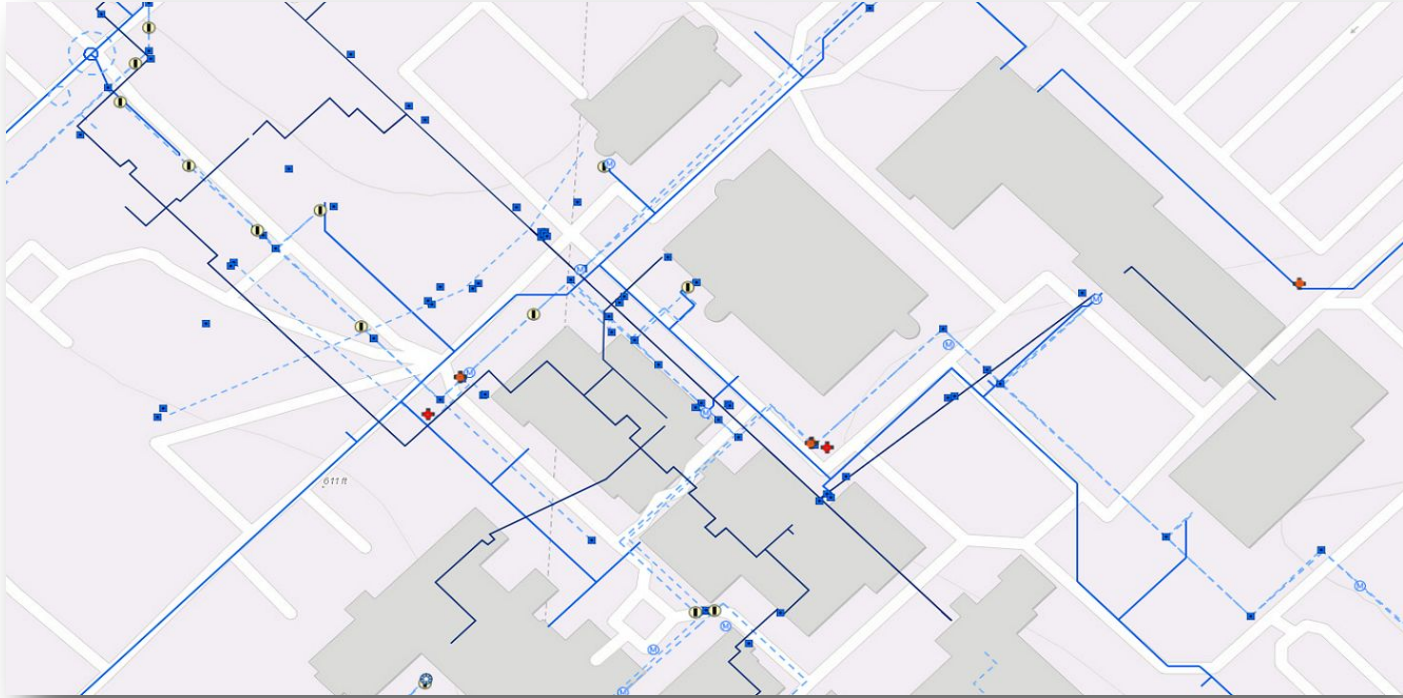
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Update with Feedback

QL-D



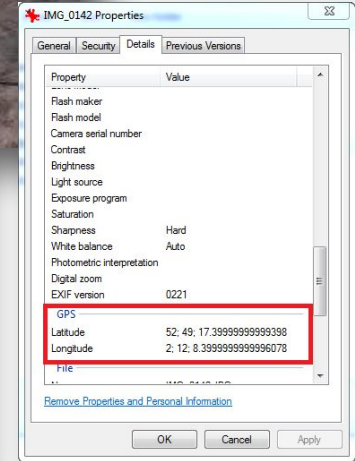
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Photos

QL-D

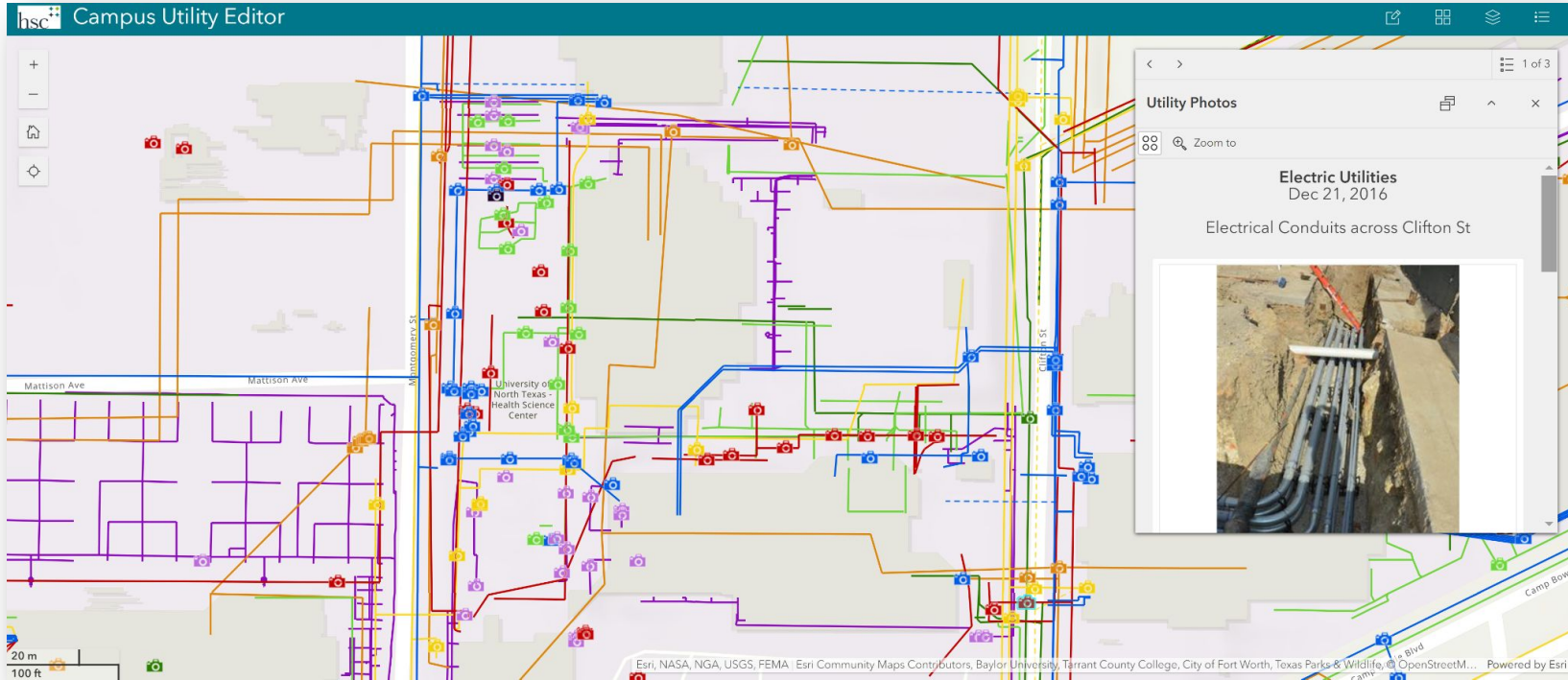


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Create a Photo Viewer

QL-D

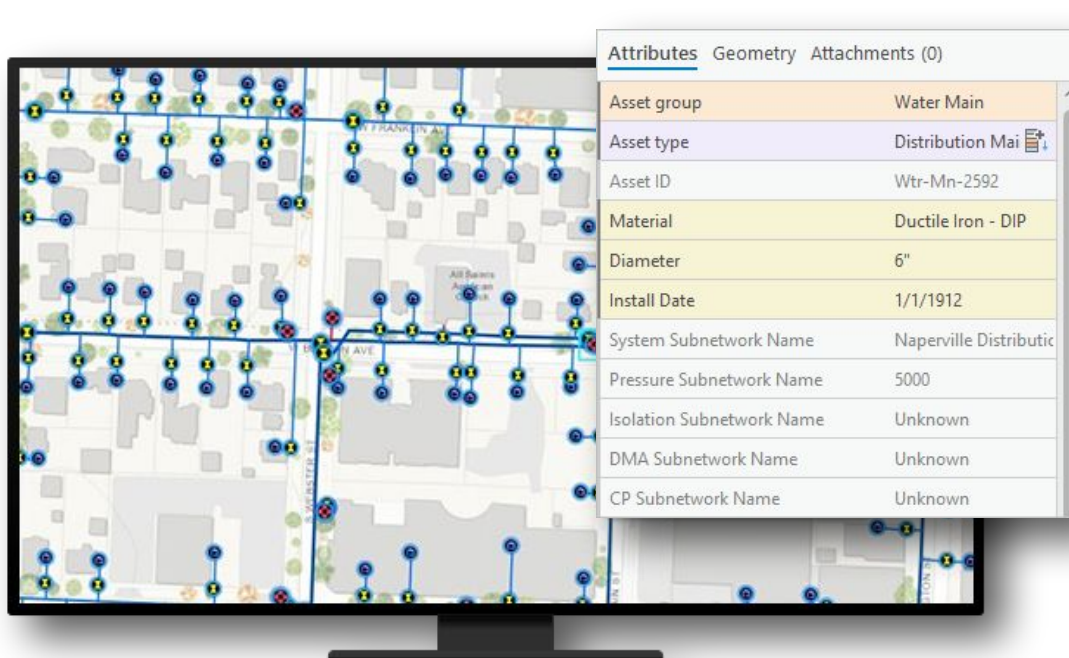


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Increase Data Accuracy/Completeness

QL-D



(1 of 3)

Water System Valves: DD-21-034

Facility Identifier	DD-21-034
Diameter	8"
Valve Type	Gate
Clockwise To Close	True
Normally Open	True
Turns To Close	
Operable	True
Currently Open	True
is Service Valve	False
Elevation	707.90
Northing	1,131,226.16
Easting	653,635.64

[Zoom to](#) [Get Directions](#) [Edit](#)



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Immediate Returns of Pilot Project

QL-D

- Application and data to use
- Users see immediate value
- Determine Priority Needs
- Order of Magnitude for Complete Effort



"I'M A STRONG BELIEVER IN CAD STANDARDS-THAT'S WHY I USE THIS EXCELLENT SET OF MY OWN"



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Improve the Data

QL-C

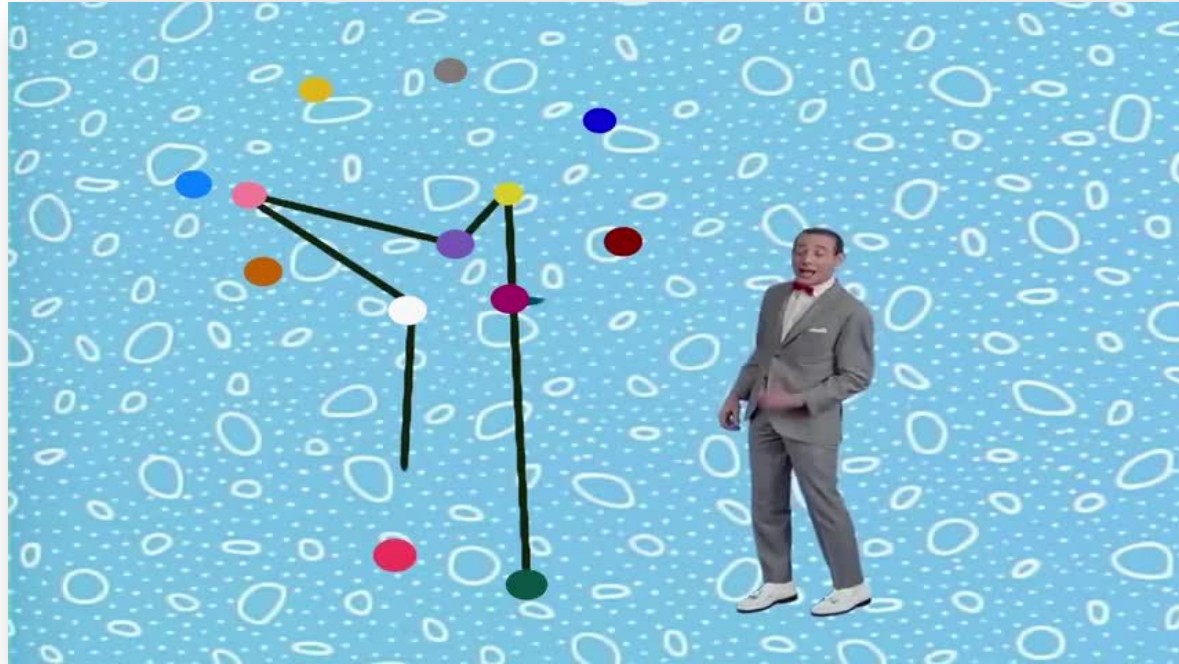


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Connect the Dots

QL-C



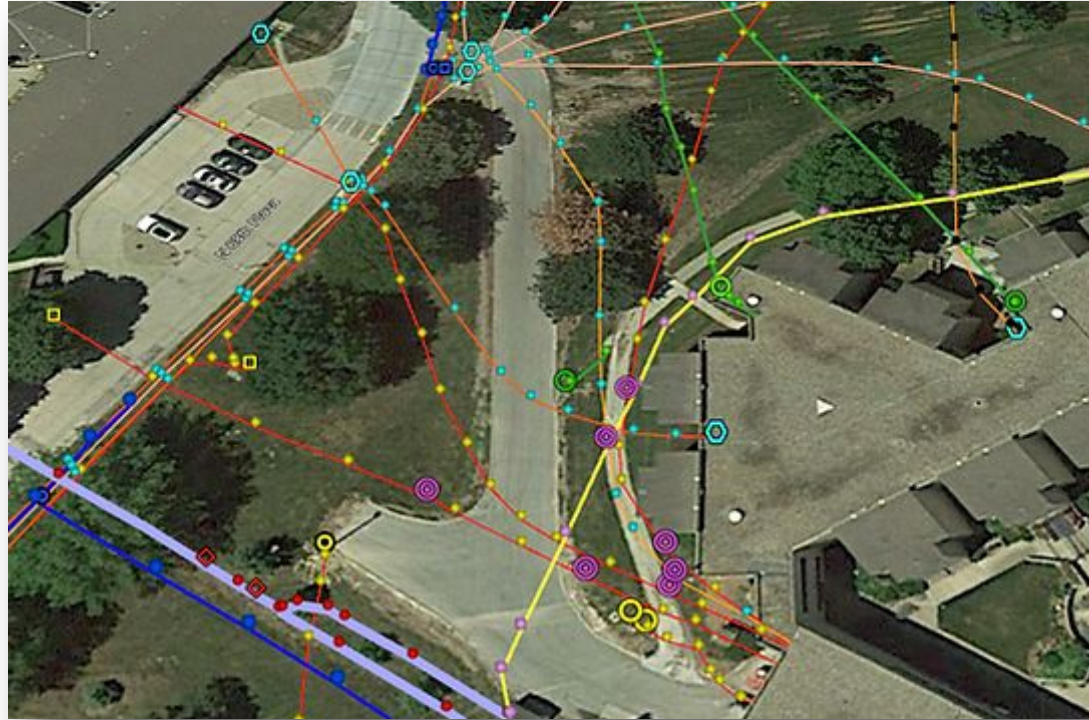
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Refine the Data

QL-C



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Field Measurements

QL-C

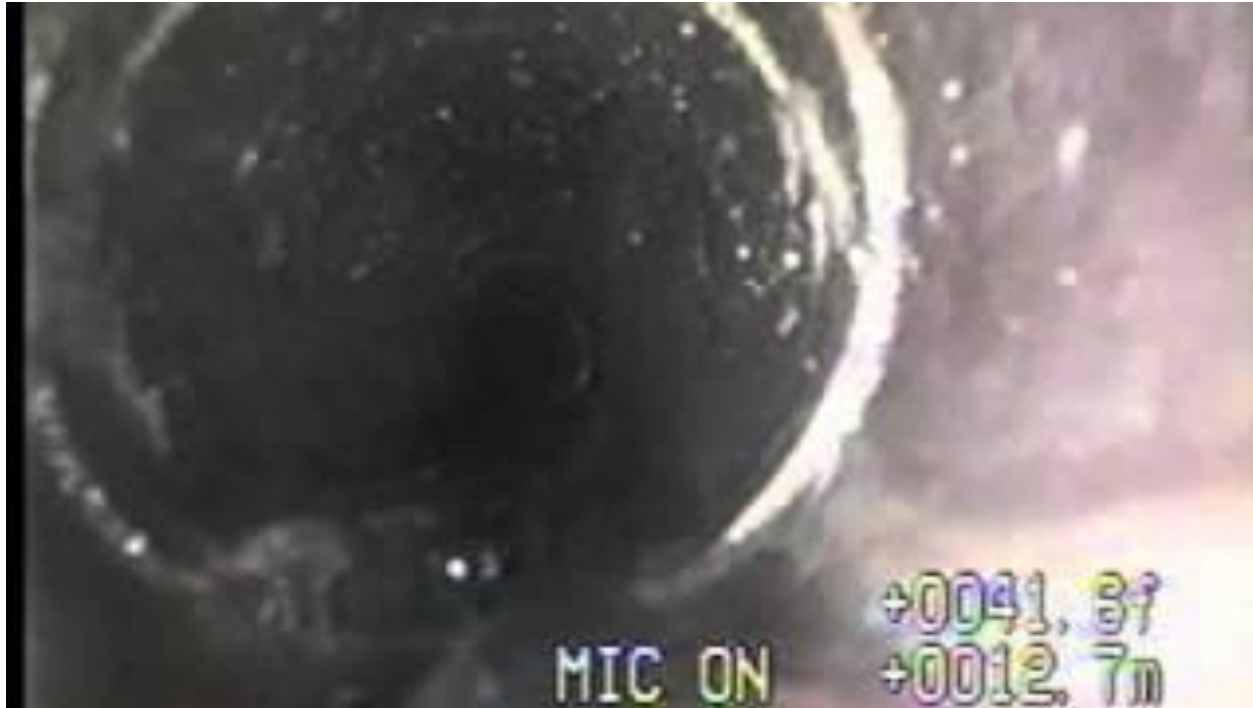


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Camera Inspections

QL-C



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Line Locates

QL-B



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Ground Penetrating Radar (GPR)

QL-B



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Exposed Pipes

QL-A



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Utility Construction

QL-A



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Utility Standards

QL-A

- Construction Standards
- GIS Deliverables
- Integrated into Your Workflows
- Call Before You Dig Systems



**Know what's below.
Call before you dig.**



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Augmented Reality



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Augmented Reality



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Lidar Scanning

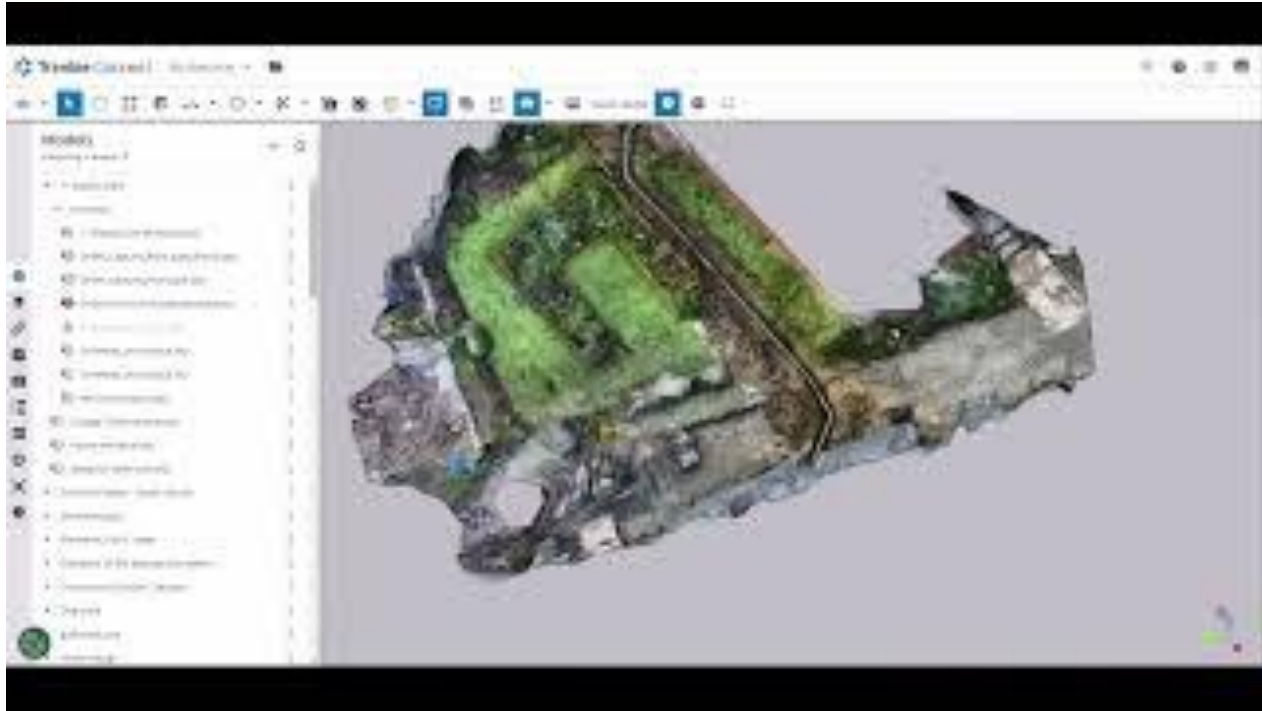


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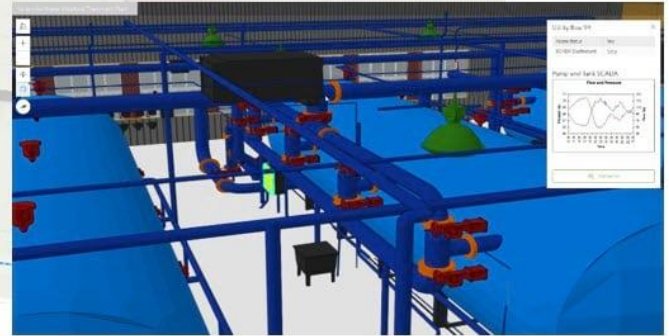
Lidar Scanning



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Interior Modelling



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360° Photos



[Link to 360° Vault](#)



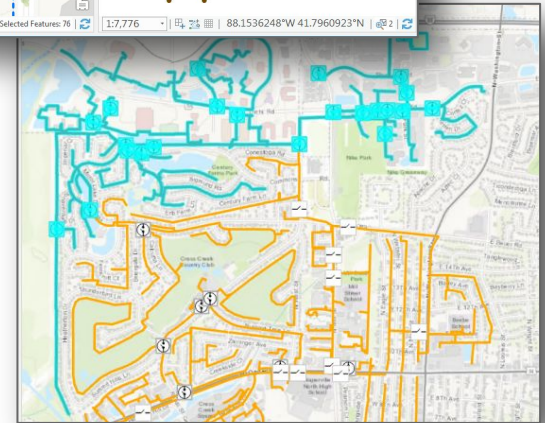
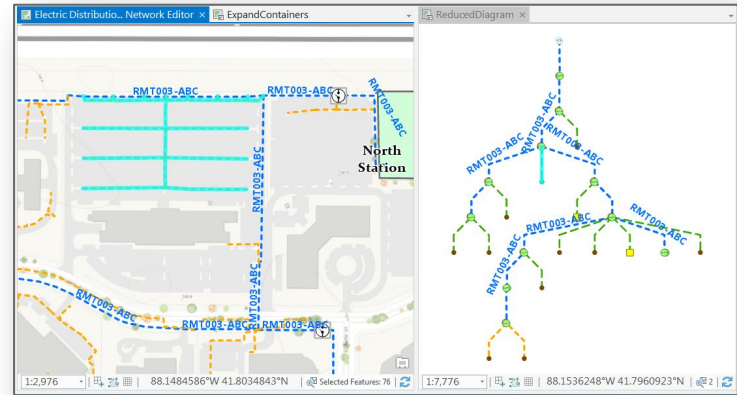
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Esri Utility Network

- Model Real-World Behavior
- Advanced Topology (Connections)
- Event Analysis
- Tracing Analysis Across Multiple Systems
- Operational View of Configuration



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Action Plan

- Start Small
- Gather Documents, Files, and Your “Fred’s”
- Pilot Projects
- Enable Field Usage Early
- Get Feedback
- Increase Data Location Accuracy
- Increase Data Attribute Accuracy
- Increase Data Attribute Completeness
- Set Standards
- Push Boundaries - AR, VR, Utility Network



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OPEN DISCUSSION

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